North Carolina Department of Transportation
Statewide Planning Branch

TECHNICAL REPORT AND STUDY FOR VALDESE, RUTHERFORD COLLEGE & CONNELLY SPRINGS

Rock School
Valdese

Town Hall
Rutherford College

Connelly Mineral Springs Hotel C. 1887
Connelly Springs

April, 2001

Valdese – Rutherford College – Connelly Springs Thoroughfare Plan

Prepared by the:

Statewide Planning Branch
North Carolina Department of Transportation

In Cooperation With:

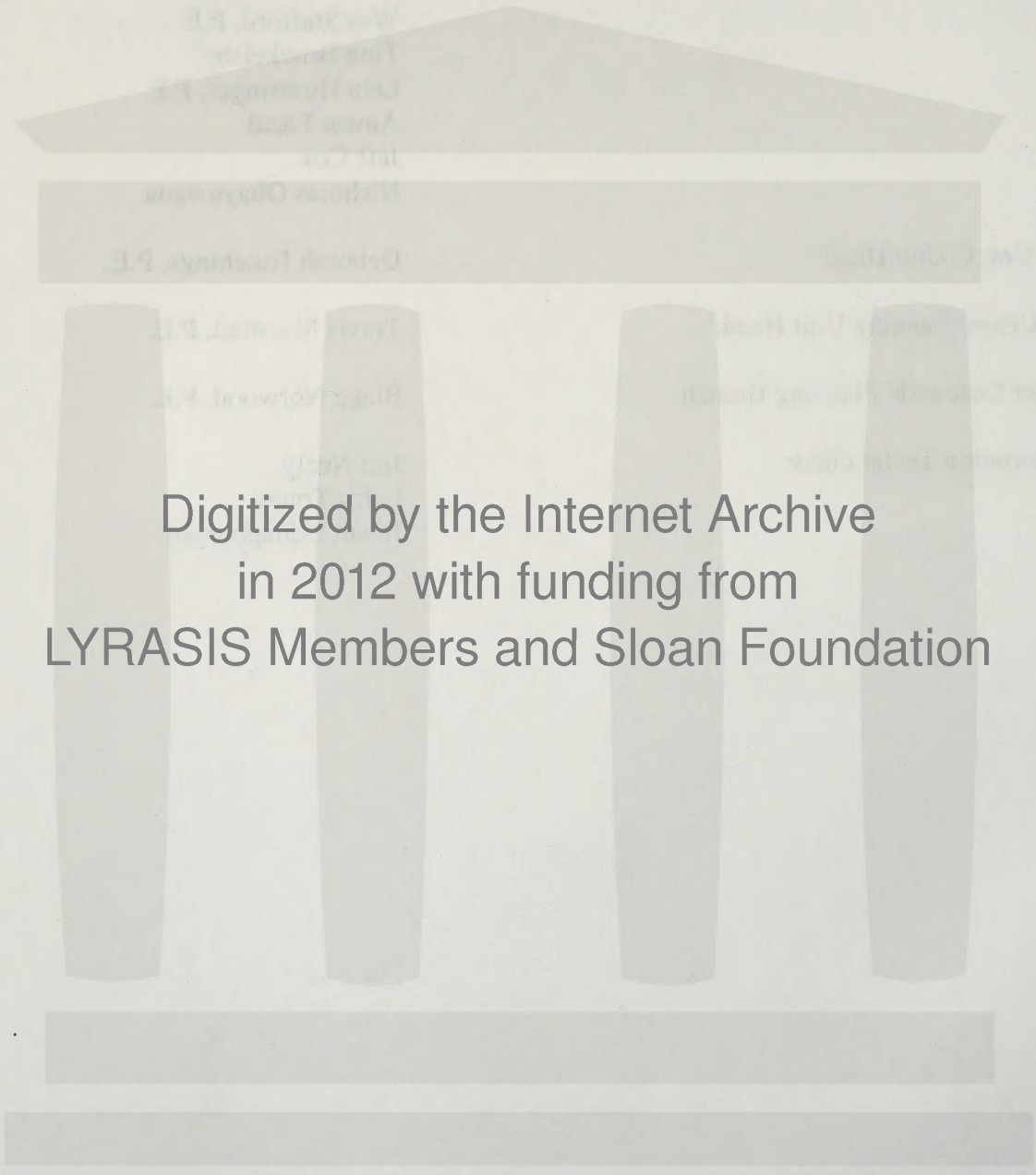
The Town of Valdese
The Town of Rutherford College
The Town of Connelly Springs
The Federal Highway Administration
U.S. Department of Transportation

April, 2001

Acknowledgments

Persons responsible for this report:

Project Engineers:	Pam R. Cook, P.E. Wes Stafford, P.E. Tina Brockelsby Leta Huntsinger, P.E. Anwar Fazal Jeff Cox Nicholas Obayuwana
Urban Unit C Unit Head:	Deborah Hutchings, P.E.
Small Urban Planning Unit Head:	Travis Marshall, P.E.
Manager Statewide Planning Branch:	Blake Norwood, P.E.
Transportation Technicians:	Jim Neely Larry Toney Jonah Uduagbomen



Valdese - Rutherford College - Connelly Springs Contact Sheet

Valdese

James Hatley,
Mayor
P.O. Box 339
Valdese, North Carolina 28690-0339
(828) 879-2120

Jeffrey V. Morse
Town Manager
(828) 879-2120

Larry Johnson
Planning Director
P.O. Box 339
Valdese, North Carolina 28690-0339
(828) 879-2124
Fax (828) 879-2139

Rutherford College

Jim O. Huffman, Sr.
Mayor
P.O. Box 406
Rutherford College, NC 28671
(828) 874-0333

Chester West
Town Engineer
(828) 433-5661

Connelly Springs

Carl C. Greene
Mayor
P.O. Box 99
Connelly Springs, North Carolina 28612-0099

Anne Marie Baker
Town Clerk
(828) 879-2321

Western Piedmont Council of Governments, Region E

John Tippett
P.O. Box 9026
Hickory, North Carolina 28603
(828) 322-9191, ext. 137
FAX (828) 322-5991

John Marshall (Valdese)
(828) 322-9191, ext. 132

Susan Baumann (Connelly Springs)
(828) 322-9191, ext. 138

Mike Struve (Rutherford College)
(828) 322-9191, ext. 148

NCDOT Contact Sheet

Secretary of Transportation
Mr. Lyndo Tippett
1501 Mail Service Center
Raleigh, NC 27699-1501
(919) 733-2520

Board Member
Allen Thornburg
P.O. Box 7625
Asheville, NC 28802
(828) 255-7641
(828) 258-9222

Division Engineer
Dan Martin, P.E.
P. O. Box 3279
Asheville, NC 28302
(828) 251-6171

District Engineer
Gary Spangler
Route 1, Box 169-C
Marion, NC 28752
(828) 652-3344

Chief Engineer (Operations)
J. D. Goins, P.E.
1537 Mail Service Center
Raleigh, NC 27699-1537
(919) 733-7621

Deputy Highway Administrator (Preconstruction)
Len Hill, P.E.
1541 Mail Service Center
Raleigh, NC 27699-1541

Statewide Planning Manager
Blake Norwood, P.E.
1554 Mail Service Center
Raleigh, NC 27699-1554
(919) 733-4705

Thoroughfare Planning Engineer
Pam R. Cook, P.E.
1554 Mail Service Center
Raleigh, NC 27699-1554
(919) 733-4705

HIGHWAY PROJECT FUNDING SOURCES

Title	Contact
Transportation Improvement Program	Board Member
Secondary Road Improvement Program	Division Engineer
Industrial Access Fund	Board Member or Division Engineer
Small Urban Project fund	Division Engineer
Enhancement Programs	Programming and TIP Branch (919) 733-3690

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CHAPTER 1

INTRODUCTION

Overview

Officials of the Towns of Valdese, Rutherford College, and Connelly Springs, prompted by a desire to adequately plan for the future transportation needs of the area, requested the North Carolina Department of Transportation's (NCDOT) assistance in conducting a thoroughfare plan study. There were several concerns of the three areas. These include the increased congestion on Malcolm Boulevard, Interstate 40 interchange configuration, and increased congestion along US 70.

The objective of thoroughfare planning is to enable the transportation network to be progressively developed to adequately meet the transportation needs of a community or region as land develops and traffic volumes increase. By not planning now for our future transportation needs, unnecessary costs to the physical, social, and economic environment may very well be incurred. Thoroughfare planning is a tool that can be used by local officials to plan for future transportation needs, while at the same time reducing the costs to our environment.

The primary purpose of this report is to present the findings and recommendations of the thoroughfare plan study conducted for the Towns of Valdese, Rutherford College, and Connelly Springs. The secondary purpose of this report is to document the basic thoroughfare planning principles and procedures used in developing these recommendations. This report can be divided into five parts. The first part of the report, Chapter 1, gives the highlights of the study. Chapters 2 and 3 provide a detailed description of the thoroughfare plan study recommendations and address different methods by which these recommendations can be implemented. The next chapter, Chapter 4, covers study procedures and findings. Chapters 5 and 6 provide a detailed description of population, land use and environmental concerns that were looked at while developing this plan. The final chapter, Chapter 7, covers traffic model development.

Information that will be especially useful to the practitioners is provided in the Appendices. The principles of thoroughfare planning are covered in Appendix A, a detailed tabulation of all routes on the Thoroughfare Plan and a graphical representation of typical cross-sections can be found in Appendix B and C respectively.

Background

Valdese, Rutherford College, and Connelly Springs are located in western North Carolina (shown in Figure 1). This area is a small urban community in the central region of Burke County, approximately 20 miles west of Hickory. The Towns are mostly residential, with some commercial and industrial development along the major thoroughfares that include I-40 and US 70. Valdese had an existing thoroughfare plan from 1978. Due to local

desire, new development and new goals, this plan was completely redone. Figure G-1 at the end of this report shows the 1978 Valdese Thoroughfare Plan.

Highlights

Major highlights of the 1998 Valdese - Rutherford College - Connelly Springs Thoroughfare Plan are outlined below. The Thoroughfare Plan map is shown in Figure 2 and the following recommendations are shown in Figure 3.

1. **MALCOLM BOULEVARD (SR 1001)** – A two lane arterial providing access to I-40 with a lot of commercial development. It is anticipated that Malcolm Boulevard will surpass its current capacity of 11,000 vehicles per day (VPD) with 14,900 vpd in 2025. It is recommended that Malcolm Boulevard be widened to five lanes from Green Street to the Burke/Caldwell County Line. It is already recommended in the Transportation Improvement Program project R-2617 to widen Malcolm Boulevard from I-40 to Green Street to five lanes to accommodate future growth.

2. **US 70 (East)** – This is a major two-lane east-west facility that runs through the planning area. To accommodate future growth, it is recommended to widen US 70 to a four-lane facility from Woodlawn Drives to the Eastern Planning Boundary, Rhodhiss Road.

3. **ENON ROAD (SR 1530)** – This facility provides a route to Heritage Middle School. To improve safety, it is recommended to improve the intersection of Enon Road and US 70.

4. **INTERSTATE 40** – Interchanges 111, 112, and 113 on I-40 serve traffic that is entering or exiting the planning area. Being bi-directional, they are considered "substandard." It is recommended to upgrade these interchanges to standard conditions to improve safety and ease congestion along the I-40 corridor. It is also recommended to widen I-40 to six lanes from the eastern planning boundary to the western planning boundary to accommodate future growth in the area.

5. **US 70 / ELDRED STREET / LAUREL STREET** – Eldred Street is a north-south route that serves as a connection to I-40. The existing traffic volume is 4,700 vpd. By the year 2025, this volume is expected to increase to 10,000 vpd. It is recommended that this facility be widened to 3 lanes from I-40 to US 70. To ease congestion along US 70 and improve safety, it is recommended to upgrade Eldred Street to state standards (12' lanes) from US 70 to Laurel Street and relocate the intersection of Laurel Street and US 70.

6. **LOVELADY ROAD** - As part of the Northeast Burke County Corridor, it is recommended to upgrade and extend Lovelady Road from its intersection with Laurel Street to Tomlinson Loop (SR 1613). This is currently a funded NCDOT TIP Project, #R-2824.

7. **METRYE AVENUE** - Meytre Avenue and Lovelady Road provide a valuable east-west corridor through the northern portion of the planning area. It is recommended that the intersections of Meytre Avenue/Laurel Street and Lovelady Road/Laurel Street be realigned at Laurel Street in order to eliminate the offset intersection. It is also recommended to upgrade Meytre Avenue from Laurel Street to Church Street and extend Meytre Avenue to intersection with SR 1535.

8. **WOODLAWN DRIVE (SR 1602)** - Woodlawn Drive is a facility parallel to Malcolm Boulevard in Rutherford College. It is recommended to extend Woodlawn Drive north to the new Lovelady Road to serve as an alternate north-south route to Malcolm Boulevard. It is also recommended to improve the horizontal and vertical alignment along the existing road.

9. **SOUTHWEST LOOP (also known as SR 1726 Extension)** -This facility, mostly on new location, will bring some relief to US 70 through Valdese by offering an alternative east-west route that bypasses the downtown area. Approximately 7600 vehicles are expected to use this route in 2025.

10. **BREVARD/ HILLTOP** - It is recommended to realign the intersection of Brevard Road and Hilltop Street at Malcolm Boulevard.

The North Carolina Department of Transportation and the Towns of Valdese, Rutherford College and Connelly Springs are jointly responsible for the proposed thoroughfare improvements. Cooperation between the State and the municipalities is of primary concern if the recommendations outlined above are to be successfully implemented. All parties have adopted the plan, and it is the responsibility of the Towns to implement the plan following guidelines set forth in Chapter 3. The Towns of Rutherford College and Connelly Springs adopted this plan on June 7, 1999. The Town of Valdese adopted this plan on August 7, 2000 and on November 3, 2000 the North Carolina Department of Transportation adopted this plan.

It is important to note that the recommended plan is based on anticipated growth within the Towns as indicated by past trends and future projections. Prior to construction of any of these projects, a more detailed study will be required to revisit development trends and to determine specific locations and design requirements.

GEOGRAPHIC LOCATION FOR VALDESE RUTHERFORD COLLEGE & CONNELLY SPRINGS NORTH CAROLINA

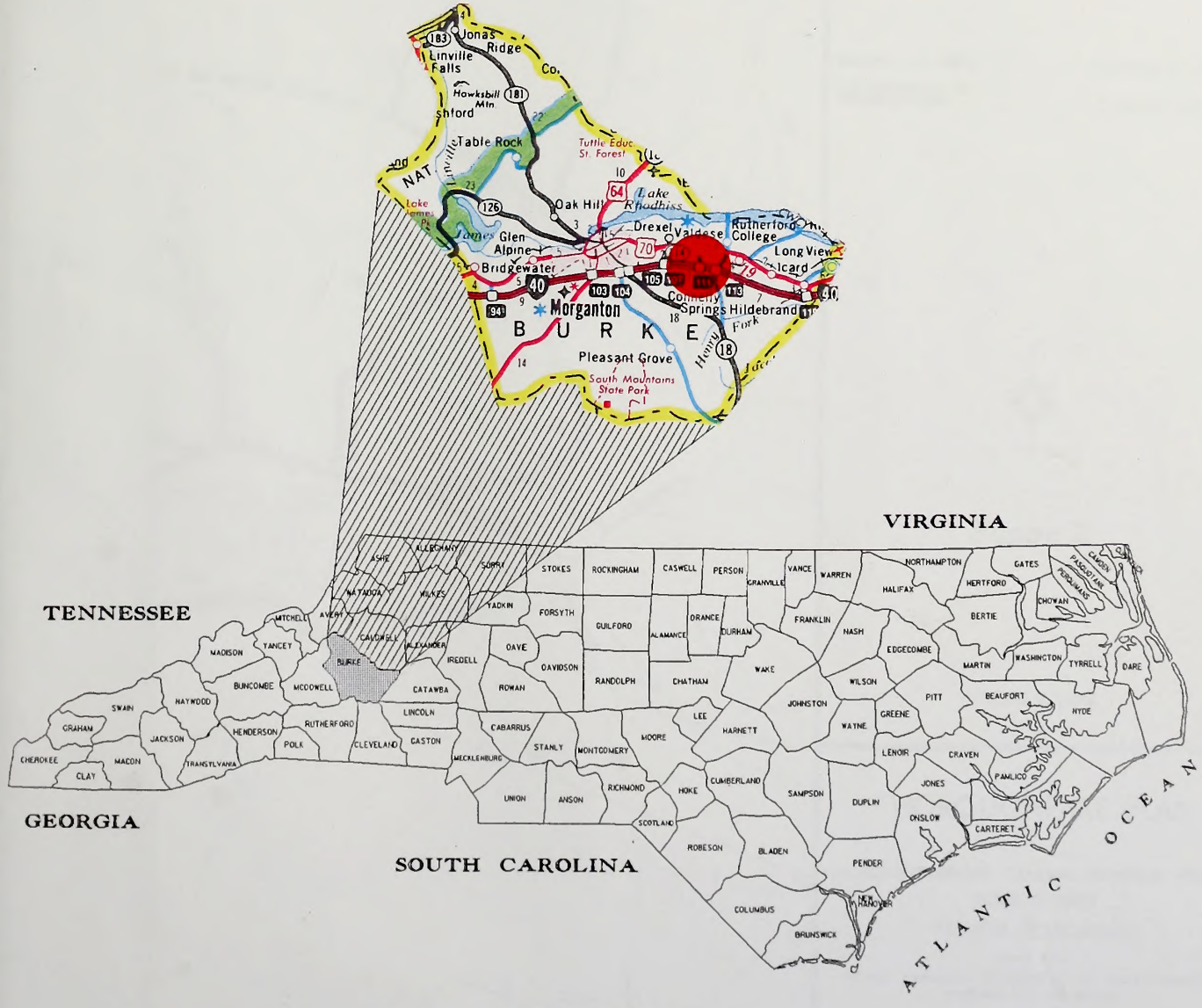
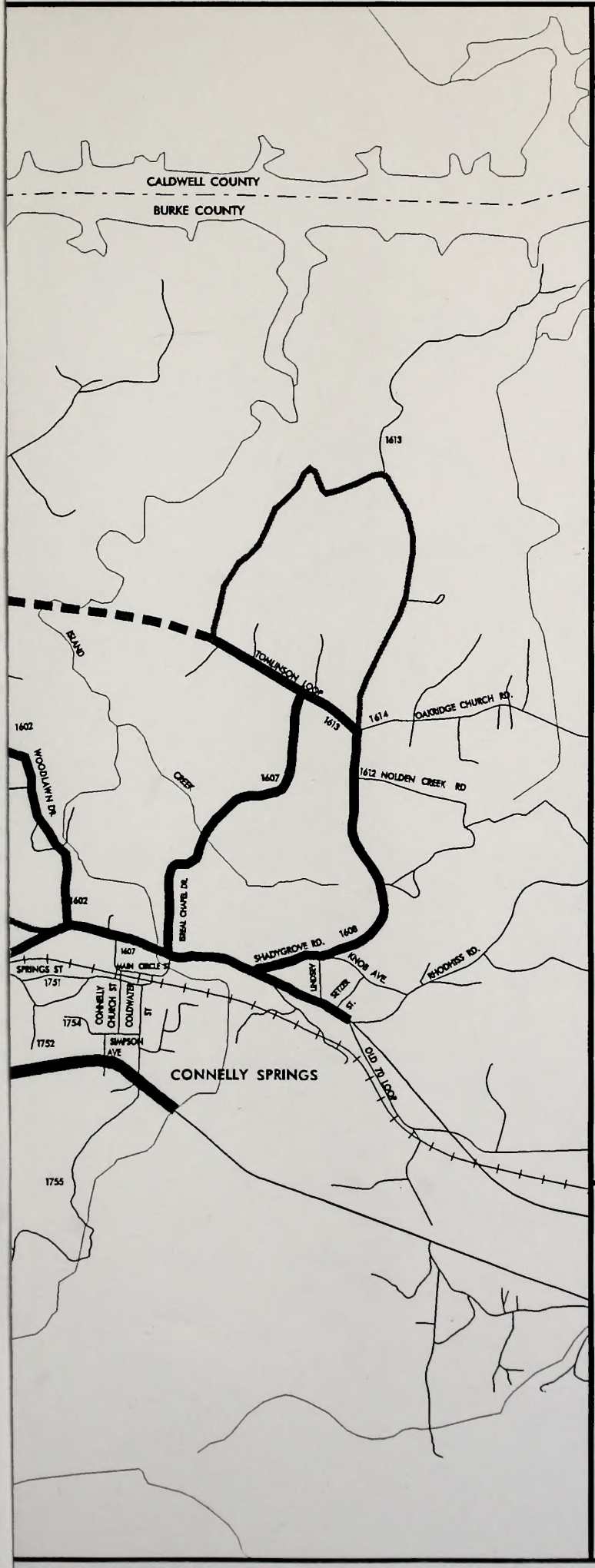


FIGURE 1



LEGEND

	EXISTING	PROPOSED
FREEWAY		
MAJOR THOROUGHFARE		
MINOR THOROUGHFARE		
INTERCHANGE		
GRADE SEPARATION		

ADOPTED BY:

TOWN OF CONNELLY SPRINGS	JUNE 7 , 1999
TOWN OF VALDESE	AUGUST 7, 2000
TOWN OF RUTHERFORD COLLEGE	JUNE 7 , 1999
STATEWIDE PLANNING	SEPTEMBER 12 , 2000
N.C. DEPARTMENT OF TRANSPORTATION	NOVEMBER 3, 2000

N

S

Figure 2

JUNE 7, 1999

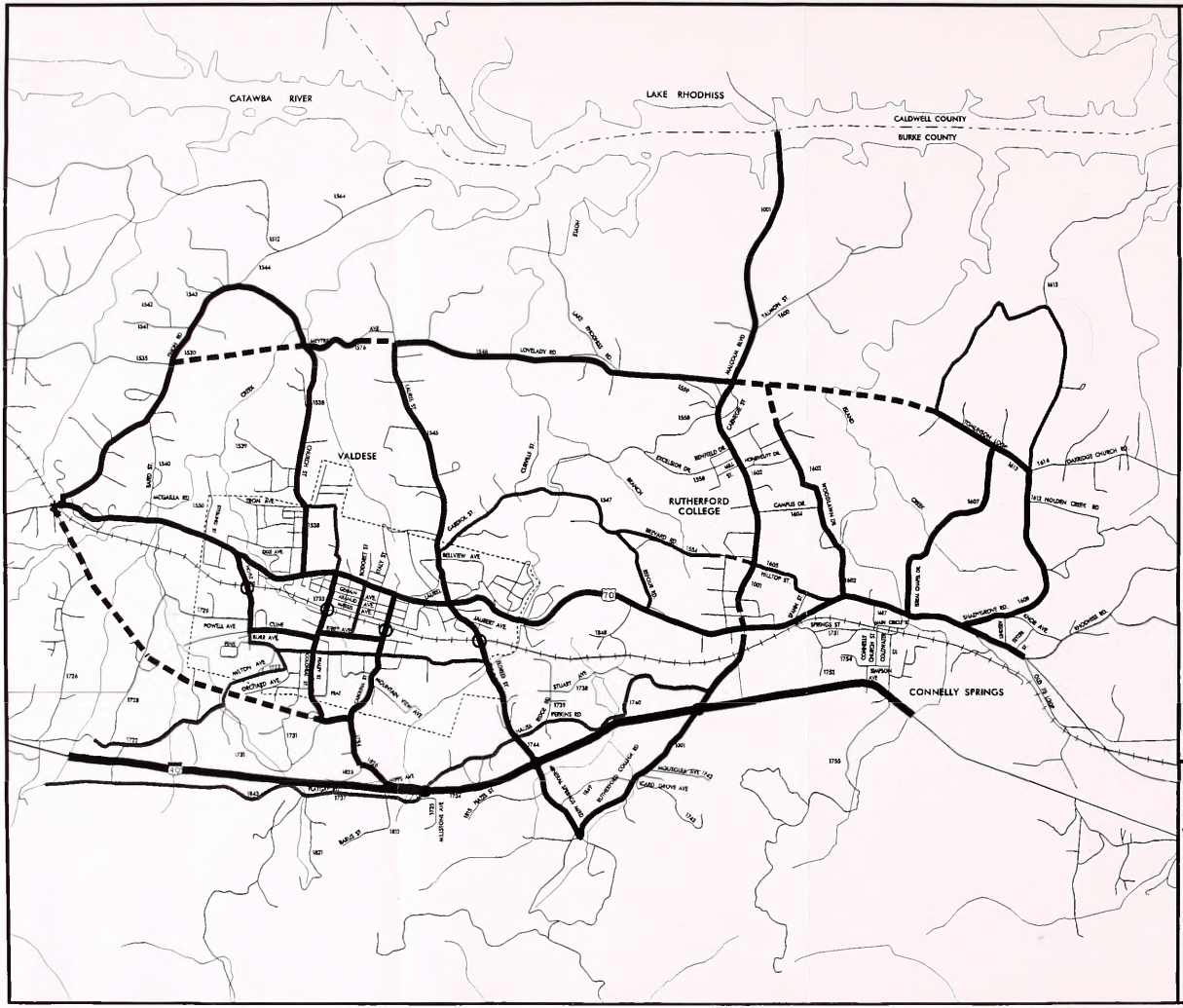
THOROUGHFARE PLAN

VALDESE-RUTHERFORD COLLEGE-CONNELLY SPRINGS
BURKE COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH

IN COOPERATION WITH THE
U.S.DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
SCALE

0 1000 2000 3000 4000
feet



LEGEND

	EXISTING	PROPOSED
FREEWAY		
MAJOR THOROUGHFARE		
MINOR THOROUGHFARE		
INTERCHANGE		
GRADE SEPARATION		

ADOPTED BY:

TOWN OF CONNELLY SPRINGS	JUNE 7 , 1999
TOWN OF VALDESE	AUGUST 7, 2000
TOWN OF RUTHERFORD COLLEGE	JUNE 7 , 1999
STATEWIDE PLANNING	SEPTEMBER 12 , 2000
N.C. DEPARTMENT OF TRANSPORTATION	NOVEMBER 3, 2000

Figure 2

JUNE 7, 1999

THOROUGHFARE PLAN

VALDESE-RUTHERFORD COLLEGE-CONNELLY SPRINGS
BURKE COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH

IN COOPERATION WITH THE
U.S.DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

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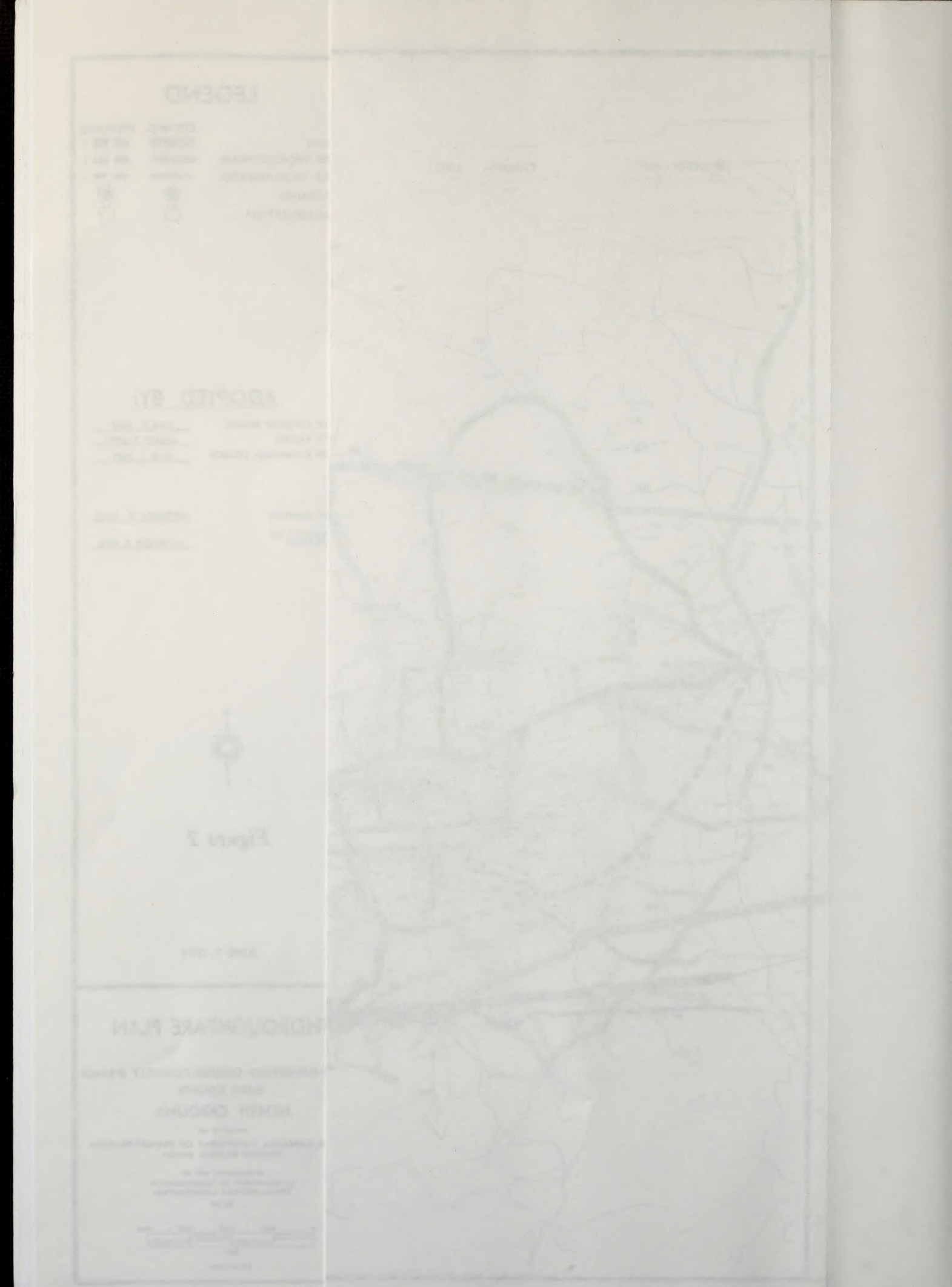


CHAPTER 2

RECOMMENDED THOROUGHFARE PLAN

Intent of the Thoroughfare Plan

Transportation is the backbone of a region's economic vitality. Without an adequate transportation system, people cannot easily reach their intended destinations, goods cannot be delivered to the market in a cost effective manner, and potential investors may look to invest in better served areas. Recent trends such as regional economies, "just in time" delivery, increased automobile ownership, and increased migration away from the central cities and towns are taxing our existing transportation system and requiring that we put more emphasis on planning for our transportation future.

A thoroughfare plan study identifies existing and future deficiencies in the transportation system, as well as uncovers the need for new facilities. The thoroughfare plan also provides a representation of the existing highway system by functional use. This use can be characterized as a part of the major or minor thoroughfares plus any new facilities that are needed. A full description of these various systems and their subsystems is given in Appendix A.

This chapter presents the thoroughfare plan recommendations. It is the goal of this study that the recommended plan set forth a transportation system that will serve the anticipated traffic and land development needs for the Towns of Valdese, Rutherford College, and Connelly Springs. The primary objective of this plan is to reduce traffic congestion and improve safety by eliminating both existing and projected deficiencies in the transportation system. Figure 3 at the end of this chapter shows the recommended improvements to the street system.

Thoroughfare Plan Recommendation

MAJOR THOROUGHFARES

These are facilities that provide for the expeditious movement of high volumes of traffic within and through the urban area.

INTERSTATE 40

- **Project Recommendation:** It is recommended that Interstate 40 be widened throughout the length of the planning area, from SR 1726 to SR 1758, from its existing 4-lane cross-section with grassed median to 6 lanes to accommodate steadily increasing traffic volumes.

  It is also recommended to upgrade Interchanges 111, 112, and 113 to standard one-way ramps in a diamond configuration. Currently each of these interchanges is configured differently, with bi-directional allowing access either into or out of the residents and businesses located along the ramps. The estimated cost of this project is $38.6 million.

- **Transportation Demand:** Due to increasing development, both residential and commercial, that is occurring in the planning area as well as across the state, traffic volumes on this route are also increasing. Annual average daily traffic volumes (AADT) in 1995 ranged from 33,300 to 38,100 vehicles per day along this part of the corridor. Based on the computerized travel demand model developed by the North Carolina Department of Transportation, which generated traffic on the transportation network based on the local area's future growth plans, traffic demand is anticipated to reach 70,000 vehicles per day in the year 2025. The anticipated daily traffic in the design year exceeds the estimated capacity of the roadway, which is 54,000 vehicles per day.

  With traffic volumes increasing along I-40 and the development which will occur in the planning area, upgrading the substandard interchanges in the planning area is imperative to the continuous flow of traffic through the area. In 1996, each ramp was carrying 1,600 vehicles per day, on average. Although the traffic volumes for the interchanges were not projected in the model, it is clear that the traffic volumes generated on I-40 will have a strong impact on the interchanges.

- **Social Demands/Economic Development:** Interstate 40 is currently a 4-lane freeway with commercial development along the facility. I-40 is the major east-west facility through the planning area, not to mention throughout the State. Traffic volumes along I-40 will continue to grow. Each day, this facility carries a number of commuters locally to the larger employment centers of Hickory and Morganton, as well as trucks, shoppers and travelers. Because of the industry located in the northern part of the planning area, a large percentage of heavy trucks comprise the total amount of traffic that utilizes the ramps.

- **System Linkage:** Interstate 40 is the primary east-west facility linking the western and eastern parts of North Carolina. Each weekday, I-40 carries a substantial amount of commuters and travelers into and through the planning area. There are no other existing facilities that could adequately serve the needs of Interstate 40. The nearest parallel facility, US 70, serves as a business route through the planning area, and lacks the capacity that serves longer distance, free-flowing travel. A two-story ramp is uncommon, and people who are unfamiliar with the area are taken by surprise at the directionality of the ramps, as well as the sharp horizontal curves, causing unsafe driving conditions.

- **Legislation:** Under Title 23, Section 119 of the United States Code (USC), Interstate Maintenance Funds, "the (Federal) Secretary may approve projects for resurfacing, restoring, rehabilitating, and reconstructing" portions of the Interstate. This portion of the USC is applicable to the substandard interchanges previously described.

US 70

- **Project Recommendation:** It is recommended that US 70 be widened to a multi-lane facility from Woodlawn Drive (SR 1602) to the planning area boundary, which is where the Old 70 Loop and Rhodhiss Road split from US 70. This widening is needed to accommodate future traffic growth. Currently, US 70 is two lanes along most of this section. It is estimated that this project will cost $2.9 million.

- **Transportation Demand:** US 70 is a minor arterial that provides one of two continuous major east-west corridors through the planning area. It is traveled heavily by residents and those who work along this commercially developed facility.

- **Capacity:** Due to increasing commercial development along this facility, traffic volumes are increasing. Average Annual Daily Traffic Volumes (AADTs) along this portion of US 70 in 1995 averaged approximately 8,000 vehicles per day (vpd). In 1998, the North Carolina Department of Transportation developed a travel demand model for the area. This model projects traffic volumes on the transportation system based on the future growth plans of the area. Based on the model, traffic volumes on US 70 between Hilltop and the EPB are anticipated to reach over 15,000 vpd by the year 2025. This volume of traffic greatly exceeds the current capacity of the roadway, which is approximately 12,000 vpd. Widening this facility to four lanes will serve the corridor's needs through the year 2025.

  Volumes between the WPB and Eldred Street are expected to range between 27,000 and 10,000. Much of US 70 in this section is currently at capacity and is expected to be over capacity by 2025. The Southwest Loop and the Meytre Avenue Extension will bring some much needed relief to this section. This section goes through the CBD area of Valdese, and widening is not an option.

- **Social Demands/Economic Development:** There is currently a substantial amount of dense commercial development either existing or planned within the corridor, including small businesses, service facilities and industry. It is anticipated that this portion of US 70 will continue to grow in this fashion. Since there are no existing parallel facilities to accommodate some or all of this growth, US 70 will need additional capacity. In addition, since the Valdese General Hospital is located on a route adjacent to this corridor and may potentially use US 70 as an emergency route, this facility's smooth operation is crucial to the well being of the area residents.

  If US 70 is not widened, excessive congestion and delay will occur along the facility, resulting in increased air pollution due to the stop and start conditions along the roadway. Safety conditions along the roadway will also decrease due to the high number and closeness of vehicles in the traffic stream.

- **System Linkage:** US 70 is the primary business east-west facility throughout the planning area. Each weekday, this facility carries a substantial number of heavy trucks, residential and commercial traffic. There are no other existing facilities that could adequately serve the needs mentioned above. The nearest parallel facility, I-40, obviously serves interstate travel, with very little commercial development and no residential development along the corridor. Constructing a new location route to handle the anticipated traffic increases in this area would cause extremely heavy disruption to the residential and commercial development that already exists.

CAROLINA STREET (SR 1734)
Design year volumes range from 1,800 to 8,400 vpd. No improvements are recommended.

CHURCH STREET (SR 1538)
Design year volumes range from 1,000 to 7,000 vpd. No improvements are recommended.

CLINE AVENUE
Design year volumes are approximately 400 vpd. No improvements are recommended.

ELDRED STREET and LAUREL STREET (SR 1545)

- **Project Recommendation:** It is recommended to upgrade Eldred Street to a two-lane facility meeting State standards (12' lanes) between Laurel Street and US 70, and relocating Laurel Street at US 70. Design year volumes along the remaining section of Laurel Street are 7,500 vpd. Also, it is recommended to upgrade Eldred Street from a two-lane facility to a three-lane facility between I-40 and US 70. These improvements are needed to accommodate existing and future traffic growth. Currently, Eldred Street is a two-lane facility, with lanes too narrow to meet State standards between Laurel Street and US 70. It is recommended to widen this section to 24' lanes. It is estimated that this project will cost $5.2 million.

- **Transportation Demand:** Eldred Street is the main north-south facility through the Town of Valdese. It provides one of only three connections to I-40 in the planning area. It is heavily traveled by residents, as well as by trucks that use this route to travel from the northern industrial section of Valdese (including but not limited to Lovelady Road) to I-40.

  Improvements to the Eldred Street/US 70/Laurel Street area will improve the flow of traffic on US 70 by reducing the amount of traffic using Laurel Street. If nothing is done to upgrade these intersections, excessive congestion and delay will occur along US 70. Safety conditions along the roadway will also decrease due to the high number and closeness of vehicles in the traffic stream.

- **Roadway Deficiencies:** Currently, Eldred Street operates under substandard conditions. The cross section of Eldred Street does not meet State standards. This project will correct the vertical and horizontal alignment of Eldred Street as well as produce an adequate cross section so the State system will be able to absorb Eldred Street. Improving the condition of Eldred Street is vital, considering the amount of truck traffic this facility carries. Approximately 2.6% of all traffic on Eldred Street is truck traffic.

- **Social Demands/Economic Development:** There is currently a substantial amount of commercial development in this area, such as gas stations, restaurants, shops, and offices. In addition, the Alba-Waldensian Bakery is located on US 70, just west of its intersection with Laurel Street. Improvements to Eldred Street would also reduce pedestrian conflicts on Laurel Street within the vicinity of the Bakery parking lot. The land use plan for the future does not indicate a change in land use pattern. In addition, future plans indicate further industrial development in the north. Eldred Street is the main link between I-40, Lovelady Road and US 70. Since there are no existing parallel facilities to accommodate some, or all, of this growth, the intersection and Eldred Street will need to be improved.

ENON ROAD (SR1530)

- **Project Recommendation:** It is recommended that Enon Road be realigned at its intersection with US 70. It is estimated that this project will cost $0.5 million.

- **Transportation Demands:** Enon Road is an important connecting link in the transportation network of western Valdese, carrying up to 2,400 vehicles per day in 1995. It is a two-lane facility with both residential and commercial development. In addition, this facility serves traffic to and from Heritage Middle School. This realignment project will improve safety at this intersection that currently has two very sharp curves. Straightening one of these curves will provide safer travel conditions for traffic, including school buses, traveling on Enon Road.

HOYLE STREET (SR 1730)

Design year volumes range from 1,200 to 2,200 vpd. No improvements are recommended.

ISRAEL CHAPEL ROAD (SR 1607)

Design year volumes range from 1,100 to 1,500 vpd. No improvements are recommended.

LOVELADY ROAD (SR 1546) and TOMLINSON LOOP (SR 1613)

As part of the Northeast Burke County Corridor, it is recommended to upgrade and extend Lovelady Road from its intersection with Laurel Street to Tomlinson Loop (SR 1613). This is currently a funded NCDOT TIP Project, #R-2824. This

improvement would give the municipalities a continuous northern route both throughout the planning area and to Hickory, which is east of the study area.

MALCOLM BOULEVARD (SR 1001)

- **Project Recommendation:** It is recommended that Malcolm Boulevard be widened to a five-lane facility from Green Street to the Caldwell County line. This widening is needed to accommodate future traffic growth. Currently, Malcolm Boulevard is two lanes along most of this section. It is already recommended in the Transportation Improvement Program project R-2617 to widen Malcolm Boulevard from I-40 to Green Street to five lanes to accommodate future growth. It is estimated that this recommendation will cost $11.3 million.

  Pedestrian traffic should be considered when widening Malcolm Boulevard near Valdese Hospital due to the large amount of pedestrian traffic in the area. During the planning stage it is encouraged to study the feasibility of putting in a pedestrian culvert or bridge crossing.

- **Transportation Demand:** Malcolm Boulevard is an arterial facility that provides one of only three connections from the planning area to I-40. It is heavily traveled by residents in both Rutherford College and Connelly Springs. Trucks also use the facility to transport goods from the Industrial park in the planning area either north or south to I-40.

- **Capacity:** Due to the increasing growth, both residential and commercial, along this facility, traffic volumes are increasing. Annual Average Daily Traffic Volumes (AADTs) along this route in 1995 ranged from 6,800 vehicles per day (vpd) at the northern end of the two-lane section to 9,200 vpd near US 70. In 1998, the North Carolina Department of Transportation developed a travel demand model for the planning area. This model projects traffic volumes on the transportation system based on future growth plans of the area. Based on the model, traffic volumes on Malcolm Boulevard are anticipated to reach 14,900 vpd by the year 2025. This volume of traffic greatly exceeds the current capacity of the roadway, which ranges form 10,500-13,000 vpd along the facility. Widening this facility to five lanes will serve the corridor's needs through the year 2025.

- **Social Demands/Economic Development:** There is currently a substantial amount of residential and commercial development either existing or planned within the corridor. In addition, there is dense commercial development near US 70. Since there are no existing parallel facilities to accommodate some or all of this growth, Malcolm Boulevard will need additional capacity. In addition, since the Valdese General Hospital is located in this corridor, this facility's smooth operation is crucial to the well being of the residents.

If Malcolm Boulevard is not widened, excessive congestion and delay will occur along the facility. This congestion will result in increased air pollution due to stop and start conditions along the roadway. Safety conditions will also decrease due to the high number and closeness of vehicles in the traffic stream.

- **System Linkage:** Malcolm Boulevard is the primary north-south facility from the northern part of the planning area to I-40. Each weekday, this facility carries a substantial number of heavy trucks from the northern Industrial section of the planning area to US 70 and I-40, the two major east-west corridors in the planning area. Also, this facility serves local traffic as the main north-south corridor through Rutherford College and Connelly Springs. Constructing a new location route to handle the anticipated traffic increases in this area would cause extremely heavy disruption to the residential and commercial development that already exists.

MEYTRE AVENUE (SR 1576)

- **Project Recommendation:** It is recommended that the intersections of Meytre Avenue/Laurel Street and Lovelady Road/Laurel Street be realigned at Laurel Street in order to eliminate the offset intersection. It is also recommended to upgrade Meytre Avenue from Laurel Street to Church Street and extend Meytre Avenue to intersection with SR 1535. It is estimated that this project will cost $4.1 million.

- **Transportation Demand:** Meytre Avenue is an important link in the northern east-west travel through Valdese. It is a two-lane facility carrying mainly residential traffic. However, due to the growing congestion on US 70, Meytre Avenue is quickly becoming an alternate east-west corridor for industrial truck traffic generated by the northern industrial park located on Lovelady Road. This recommendation, along with the funded NCDOT Transportation Improvement Program (TIP) project #R-2824, the Lovelady Road Extension, will give the municipalities a continuous northern route that would take them to Hickory and the Hickory Airport.

- **Capacity:** 1995 average daily traffic (ADT) counts on Meytre Avenue indicate 2,000 vehicles per day. Although this volume is not close to the capacity of the roadway, 10,500 vpd, improving and extending Meytre Avenue will alleviate some of the congestion problems along US 70. In 1995, US 70 was carrying 15,100 vpd, and it is anticipated to increase to 27,000 vpd in 2025. Based on a travel demand model developed by NCDOT, the implementation of this recommendation will pull 4,000 vpd onto Meytre Avenue, thus easing congestion along US 70.

- **Social Demands/Economic Development:** The northern industrial park located on Lovelady Road generates truck traffic in the northern part of the planning area. This type of development is expected to continue, thus continuing to degrade the ability of the road to carry traffic safely and

smoothly. Due to the heavy commercial and industrial development along US 70, as well as the on street parking widening that facility is not feasible.

- **System Linkage:** Improving and extending Meytre Avenue will create a northern corridor for east-west travel throughout the planning area. Currently, Lovelady Road is in the process of being upgraded and extended in the eastern part of the planning area. Implementing this recommendation would fulfill the need for an alternate local route to US 70.

  The realignment project will connect two existing major facilities to provide a continuous route by which travelers can access any of the major routes in the eastern and western parts of the planning area.

MINERAL SPRINGS MOUNTAIN ROAD (SR 1744)
Design year volumes range from 2,200 to 3,200 vpd. No improvements are recommended.

PRALEY STREET (SR 1733)
Design year volumes range from 500 to 3,000 vpd. No improvements are recommended.

RIBET AVENUE
Design year volumes are approximately 600 vpd. No improvements are recommended.

RUTHERFORD COLLEGE ROAD - (SR 1001) - Design year volumes are expected to be around 4,400 vpd between I-40 and the Southern Planning Boundary. No improvements are recommended.

SHADYGROVE ROAD (SR 1608)
Design year volumes range from 1,200 to 2,900 vpd. No improvements are recommended.

SOUTHWEST LOOP (also known as SR 1726 Extension)

- **Project Recommendation:** It is recommended to use part of SR 1726 near US 70 and then extend over to Praley Street on new location to form an east-west facility in the southwest quadrant of the planning area. It is recommended to build a two-lane facility on 100' of right-of-way. This improvement is needed to accommodate future traffic growth along US 70 as an alternate route through the southern portion of Valdese. It is estimated that this project will cost $ 3.0 million in construction cost.

- **Transportation Demands:** There needs to be more continuous east-west facilities in the area to offer much needed relief to US 70. US 70 is the principal arterial through the planning area, which serves residential, commercial and industrial traffic. US 70 serves through-trips, external-internal

trips and local trips. Due to the increasing commercial growth along US 70, traffic volumes are increasing. Annual average daily traffic volumes along US 70 in 1995 ranged from 6,500-13,000 vehicles per day. Based on the computerized travel demand model developed by the North Carolina Department of Transportation, traffic volumes are anticipated to reach 27,000 vehicles per day by the year 2025. This new route will offer local traffic an alternative east-west route in the area.

- **Capacity:** The anticipated daily traffic along US 70 in 2025 far exceeds the estimated capacity, which ranges from 9,700 – 12,500 vehicles per day. The SW Loop will provide an alternate facility for travel in the area.

- **Social Demand/Economic Development:** US 70 is currently a two-lane arterial with on-street parking which serves dense commercial and industrial development. This route contains many of the commercial amenities needed by area residents in the numerous shops, banks, restaurants, churches, service stations and offices located in the corridor. Several industries are also located in this corridor. Because of the heavy development along the road, US 70 is not only a major peak-hour commuting route, but also a destination in the off-peak hours for shoppers, travelers, and truckers. St. Germain is a parallel facility that can accommodate some of the additional capacity required for future growth. Widening US 70 is not a feasible alternative due to historic structures located along this section of the facility. Alternate routes to the north and south of US 70 were investigated using the travel demand model. The SW Loop alleviated additional congestion from US 70.

WOODLAWN DRIVE (SR 1602)

- **Project Recommendation:** It is recommended to extend Woodlawn Drive from its northern terminus to its intersection with the proposed new location section of Lovelady Drive (SR 1546, TIP #R-2824). The extension of Woodlawn Drive will provide an alternate north-south facility in the Town of Rutherford College. Currently, Malcolm Boulevard is the sole north-south facility through this municipality. It is also recommended to improve the horizontal alignment as needed along Woodlawn Drive. It is estimated that this project will cost $2.1 million.

- **Transportation Demand:** As mentioned above, Malcolm Boulevard is the main north-south route through Rutherford College and the eastern part of the planning area. As stated in earlier correspondence with the Town of Rutherford College, the town desires this improvement. They are unable to shut down Malcolm Boulevard for public events such as parades because of the need to maintain the only entrance to Valdese General Hospital (on Malcolm Boulevard) in the event of an emergency.

  For safety reasons, it is recommended to improve the horizontal alignment of Woodlawn Drive. Currently, there is a curve that lies at almost 90°.

Improving this section would remove the threat of accidents, especially with emergency vehicles, along a facility that will become more highly traveled, as shown below.

- **Capacity:** Currently, the capacity of existing Woodlawn Drive is 9,000 vehicles per day. A travel demand model developed for the planning area by NCDOT was used to project traffic on the transportation network based on future growth projections provided by the local area. Based on the projections, the extension of Woodlawn Drive will alleviate some congestion on Malcolm Boulevard.

MINOR THOROUGHFARES

The main purpose of roadway serving as minor thoroughfares is to collect traffic from local access streets and carry it to the major thoroughfares.

BREVARD ROAD (SR 1554)

Design year volumes range from 1,300 to 2,300 vpd. It is recommended to realign the intersection of Brevard Road and Hilltop Street at Malcolm Boulevard. It is estimated that this improvement will cost $1.55 million.

FLATGAP ROAD (SR 1737)

Design year volumes range from 1,300 to 2,300 vpd. No improvements are recommended.

GARDIOL STREET / REFOUR ROAD (SR 1547)

Design year volumes range from 300 to 1,500 vpd. No improvements are recommended.

HILLTOP STREET (SR 1605)

Design year volumes are approximately 1,600 vpd. No improvements to the roadway are recommended. It is, however, recommended to realign the intersection of Brevard Road and Hilltop Street at Malcolm Boulevard to improve safety and provide a smoother flowing travel route. It is estimated that this improvement will cost $1.55 million.

JACUMIN ROAD (SR 1843)

Design year volumes are approximately 1,200 vpd. No improvements are recommended.

MILTON AVENUE (SR 1722)

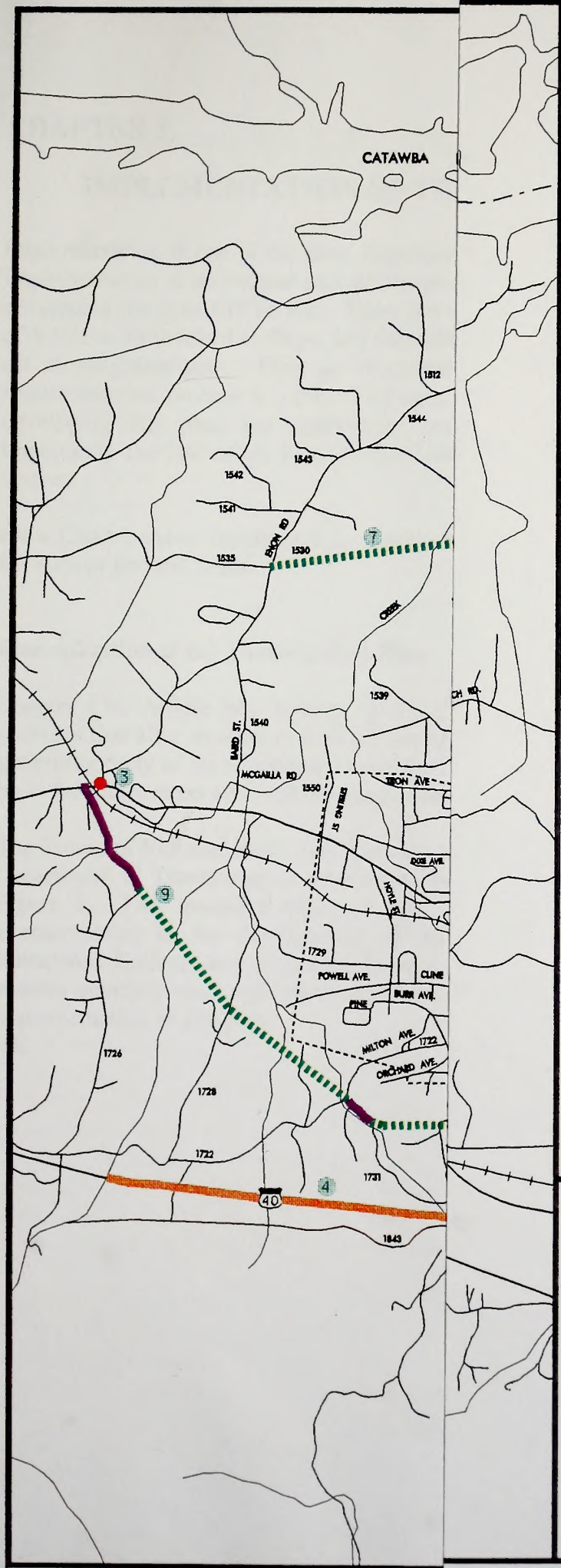
Design year volumes range from 1,000 to 1,500 vpd. No improvements are recommended.

PINEBURR AVENUE
Design year volumes range from 400 to 1,600 vpd. No improvements are recommended.

RODORET STREET
Design year volumes on this facility are approximately 1,600 vpd. No improvements are recommended.

SR 1740 (HAUS PERKINS ROAD) - Design year volumes are expected to range from 400 to 1,000 vpd. No improvements are recommended.

TOMLINSON LOOP (SR 1613)
Design year volumes of the loop portion of this facility are approximately 2,300 vpd. No improvements are recommended.



RECOMMENDED IMPROVEMENTS

LEGEND

- WIDEN TO MULTI-LANE FACILITY
- UPGRADE TO STATE STANDARDS
- NEW LOCATION
- HORIZONTAL AND VERTICAL ALIGNMENT IMPROVEMENTS
- TIP R-2824 (EXISTING)
- TIP R-2824 (PROPOSED)
- TIP R-2617
- REFER TO PROJECT DESCRIPTIONS IN HIGHLIGHTS SECTION — 00
- INTERCHANGE IMPROVEMENT
- INTERSECTION IMPROVEMEMT

FEBRUARY 2, 2000

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Figure 3

VALDESE–RUTHERFORD COLLEGE–CONNELLY SPRINGS

BURKE COUNTY

NORTH CAROLINA

PREPARED BY THE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH

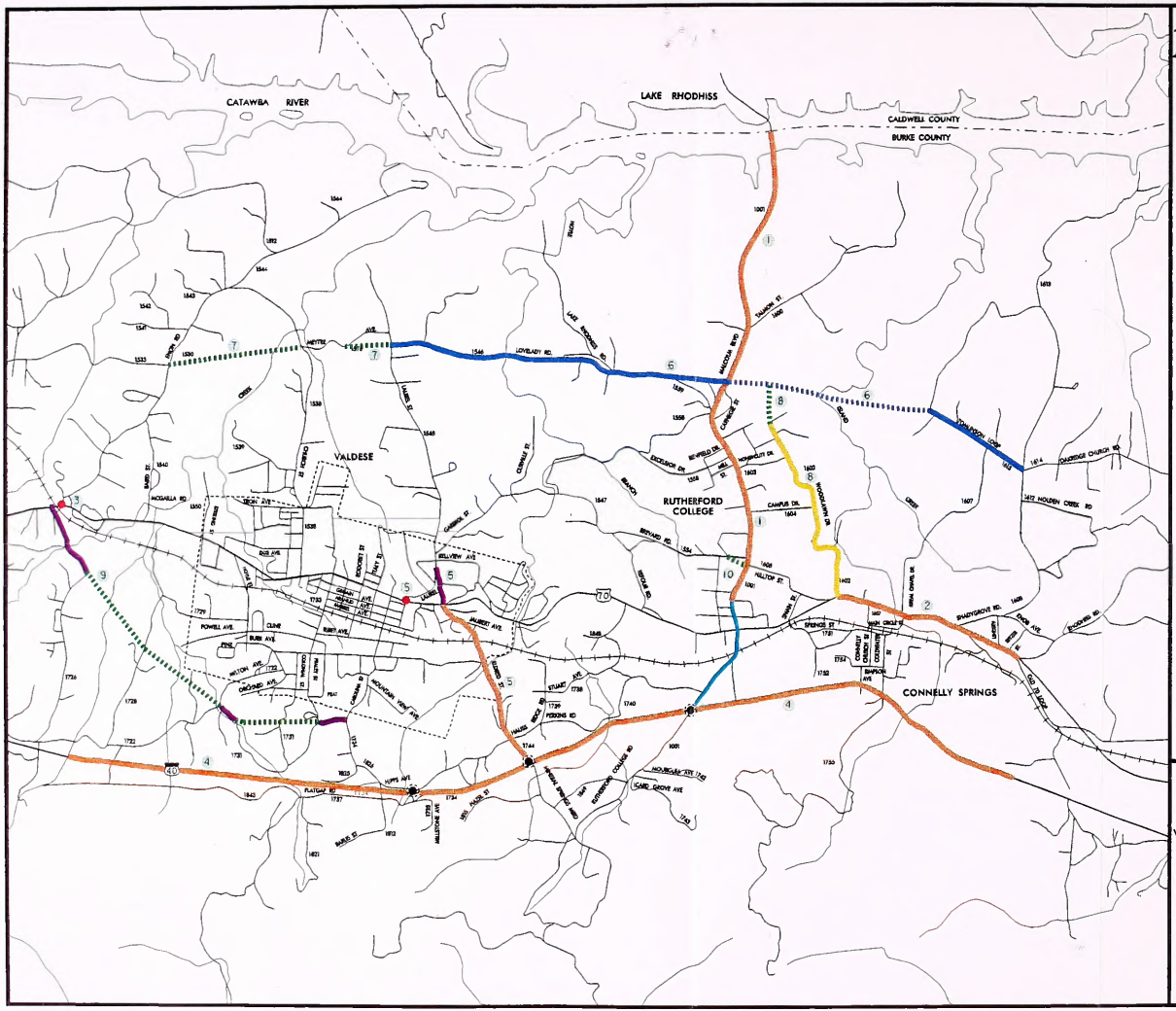
IN COOPERATION WITH THE

U.S.DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

0 1000 2000 3000 4000

feet



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SCALE

0 1000 2000 3000 4000

Feet

CHAPTER 3

IMPLEMENTATION OF THE THOROUGHFARE PLAN

Implementation is one of the most important aspects of the transportation plan. Unless implementation is an integral part of this process, the effort and expense associated with developing the plan will be lost. There are several tools available for use by the Towns of Valdese, Rutherford College, and Connelly Springs to assist in the implementation of the thoroughfare plan. They are described in detail in this chapter. To neglect the implementation process is a three-fold loss; the loss of the capital expenditures used in developing this plan, the opportunity cost of the capital expenditures, and more importantly the loss of the benefits that would accrue from an improved transportation system.

Flow Chart 1 shows the general development process for a new road that is to be funded by State or Federal funds.

Plan Adoption of the Thoroughfare Plan

Chapter 136, Article 3A, Section 136-66.2 of the General Statutes of North Carolina provides that after development of a thoroughfare plan, the plan is to be adopted by the governing body of the municipality and the Department of Transportation to serve as the basis for future street and highway improvements.

The Towns of Valdese, Rutherford College, and Connelly Springs and the North Carolina Department of Transportation have mutually approved the thoroughfare plan shown in Figure 2. This mutually approved plan serves as a guide for the Department of Transportation in the development of the road and highway system for Valdese, Rutherford College, and Connelly Springs. The approval of the plan by the Towns enables standard road regulations and land use controls to be used effectively in the implementation of this plan.

Methods Used to Protect the Adopted Thoroughfare Plan

Future Street Line Ordinances

A municipality with legislative approval may amend its charter to be empowered to adopt future street line ordinances. This ordinance, enacted for selected streets, is particularly beneficial for planned future improvements, such as roadway widening. Through a metes-and-bounds description of a street's future right-of-way requirements, the municipality may prohibit new construction or reconstruction of structures within the future right-of-way. This approach requires specific design hearings to be held as an opportunity for affected property owners to obtain information about what to expect and to make necessary adjustments without undue hardship.

A future street line ordinance differs from a setback line in a zoning ordinance. Setback lines in a zoning ordinance are based on requirements for light, air, health, etc., not for future streets.

Land Use Regulations

Land use regulations are an important tool in that they regulate future land development and minimize undesirable development along roads and highways. The land use regulatory system can improve highway safety by requiring sufficient setbacks to provide for adequate sight distances and by requiring off-street parking.

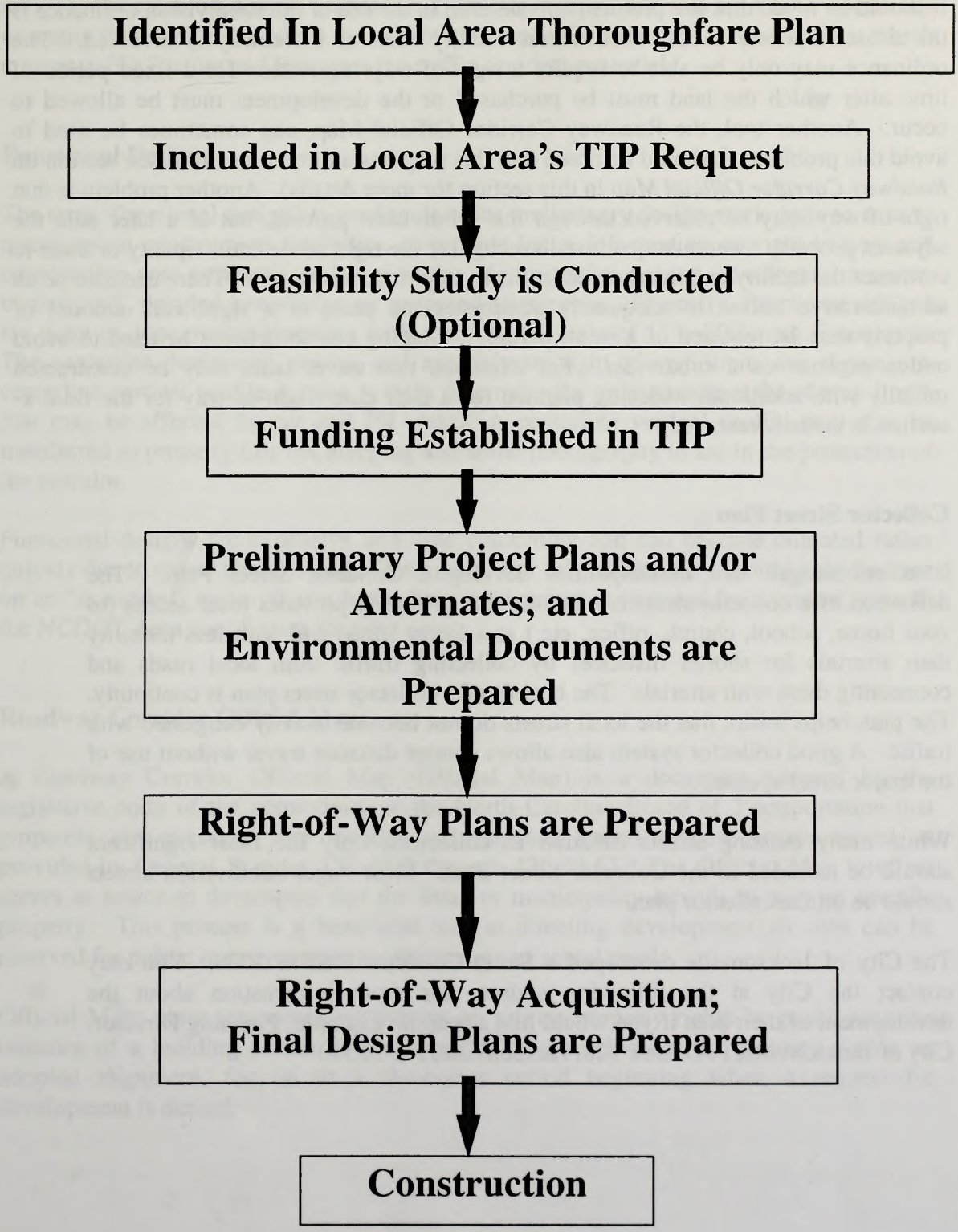
Subdivision Regulations

Subdivision regulations are the most useful tool for implementation of the thoroughfare plan. Local subdivision regulations are locally adopted laws governing the process of converting raw land into building sites. Subdivision Regulations require every sub-divider to submit to the Town Planning Board a plan of any proposed subdivision. From the planner's view, subdivision regulations are important at two distinct levels. First, they enable the planner to coordinate the otherwise unrelated plans of many individual developers. This process assures that provision is made for land development elements such as roadway right-of-way, parks, school sites, water lines, and so forth. Second, they enable the planner to control the internal design of each new subdivision so that its pattern of streets, lots, and other facilities will be safe, pleasant, and economical to maintain. The construction of subdivision streets to adequate standards reduces maintenance costs and simplifies the transfer of streets to the State Highway System.

To be most effective, subdivision regulations and their administration must be closely coordinated with other local governmental policies and ordinances. Among the more important of these are the Comprehensive Growth Plan, Utilities Extension Master Plan, CAMA Land Use Plan, the Transportation/Thoroughfare Plan, and the Collector Street Plan.

Development Process For A New Road

Flow Chart 1



In practice, subdivision regulations can provide some very positive benefits such as requiring portions of major streets to be constructed in accordance with the Transportation/Thoroughfare Plan, or requiring sub-dividers to provide for the dedication and/or reservation of rights-of-way in advance of construction. These practices reduce the overall cost of the plan by having some costs borne by developers.

It should be noted that one problem encountered in the use of the subdivision ordinance is the situation where a controlled access facility such as a freeway is involved. The ordinance may only be able to require a right-of-way reservation for a fixed period of time after which the land must be purchased or the development must be allowed to occur. Another tool, the Roadway Corridor Official Map, can sometimes be used to avoid this problem. It should be noted that this map has a three year limit (see section on *Roadway Corridor Official Map* in this section for more details). Another problem is that right-of-way may be reserved through the subdivision process, but at a later date the adjacent property owners may refuse to recognize the right of the municipality or State to construct the facility and use their concerns to stop the construction. There can also be an administrative failure to adequately administer the plan, or a significant amount of property may be required of a small parcel. Staging can sometimes be used to avoid undue expense on a subdivider. For example, two travel lanes may be constructed initially with additional widening planned for a later date (right-of-way for the final x-section is initially reserved).

Collector Street Plan

It is encouraged that municipalities develop a Collector Street Plan. The definition of a collector street is a facility that primarily provides local access (to your home, school, church, office, etc.) at a lower speed and with less mobility than arterials for shorter distances by collecting traffic from local roads and connecting them with arterials. The benefit of a collector street plan is continuity. The plan helps insure that the local streets do not become heavily congested with traffic. A good collector system also allows shorter distance travel without use of the major street system.

While many existing streets function as collectors, only the most significant should be included in the Collector Street Plan. Most major subdivision streets should be on the collector plan.

The City of Jacksonville developed a Street Collector Plan in 2000. You may contact the City at the following address for more information about the development of their plan if you would like a specific example: Planning Director, City of Jacksonville, P. O. Box 128, Jacksonville, NC 28540

Zoning Ordinances

Local zoning ordinance can be beneficial to thoroughfare planning by designating appropriate locations of various land-use and allowable densities of residential development. This provides a degree of stability on which to make future traffic projections and to plan streets and highways. Other benefits of good zoning ordinance are: (1) the establishment of standards of development which will aid traffic operations on major thoroughfares and (2) the minimization of strip commercial development which creates traffic friction and increases the traffic accident potential.

Functional Designs

The term "functional design" is used to describe preliminary design work done to answer questions on construction feasibility, to provide better information on right-of-way and construction cost estimates, and to give the administrative agency, developers, property owners, etc., detailed knowledge on proposed alignments. Typically, functional designs are done on topographic mapping with a horizontal scale of 1" = 200' with 5' contours. The centerline, horizontal curves, and approximate right-of-way limits are shown. A centerline vertical profile is done to help determine the approximate right-of-way limits that may be affected by cut and fill areas. A centerline vertical profile may also be transferred to property line tax mapping and aerial photography to aid in the protection of the corridor.

Functional designs are expensive and time consuming and can become outdated rather quickly due to minor changes and adjustments. For this reason, they should only be done on an "as needed" basis. If you feel a functional design is required for a project, consult the NCDOT Area coordinator for your area.

Roadway Corridor Official Maps

A Roadway Corridor Official Map (Official Map) is a document adopted by the legislative body of the community or the North Carolina Board of Transportation that pinpoints and preserves the location of proposed streets against encroachment as provided by General Statutes 136-44.5 through 136-44.53. The Official Map in effect serves as notice to developers that the State or municipality intends to acquire specific property. This process is a beneficial tool in directing development so sites can be reserved for public improvements in anticipation of actual need.

Official Maps place temporary restrictions on private property rights by prohibiting the issuance of a building permit or the approval of a subdivision on property within an adopted alignment, for up to a three-year period beginning when a request for development is denied.

Requests for NCDOT to prepare and adopt an official map should be sent to the Program Development Branch. (NCDOT typically only does Corridor Official Maps for controlled access facilities outside or through a municipal boundary). For towns contemplating the adoption of an official map, there are two ways in which the town may proceed. The first is to consider the official map statute as a stand-alone authority and use it as the basis for local adoption of an official map. Alternatively, the second approach is to adopt a local ordinance modeled after the statute, but modified to fit local circumstances and clarify the statute. Regardless of the approach taken, several procedural steps will need to be considered, such as establishing procedures for consideration of variance petitions.

Once the project has been selected and the alignment determined, maps must be prepared that are suitable for filing with the County Register of Deeds Office. The map should show the proposed alignment in sufficient detail to identify the functional design and the preliminary right-of-way boundaries. Since the purpose of the map is to show the effect on properties along the project path, the existing property boundaries should be identified. **As an additional requirement, within one year of the adoption of an official map, work must begin on an environmental document or preliminary engineering.**

It is important to recognize the risks inherent in the adoption of an official map prior to completing the environmental studies. Projects to be funded using any federal funds require the unbiased evaluation of alternate alignments. This means that other alternatives can be studied and compared to the protected alignment. The risks are generally offset by the protection of the corridor and its viability for future construction. Care must be given to include social and natural environment issues when conducting the preliminary environmental study.

The above information is only to serve as an introduction to official maps, and in no way provides the information necessary to begin development of an official map. Requests for maps or guidance for municipal adoption should be sent to the following:

Program Development Branch
Mail Service Center #1534
Raleigh, North Carolina 27699-1534
(919) 733-2039

Dedication of Right-of-Way with Density or Development Rights Transfer

The North Carolina General Statutes amended in 1987 provided this additional tool for plan implementation. The statues provide that a town or county may require an applicant for subdivision approval; or special use permit, conditional use permit, or special exception; or for any other permission pursuant to a land use control ordinance to dedicate for street or highway purposes, the right-of-way within a corridor if the town or county allows the applicant to transfer density credits attributable to the dedicated right-

of-way to contiguous land owned by the applicant. No dedication may be required if the dedication results in deprivation of a reasonable use of the original tract. The dedication must be reasonably related to traffic generated by the proposed subdivision, or use of the remaining land, or the impact dedication mitigated by measures provided in the local ordinance.

If the town or county does not require dedication of right-of-way under these statutes or other legal authority, but an applicant elects to dedicate the needed right-of-way, the town or county may allow the applicant to transfer density credits attributable to the dedicated right-of-way to contiguous land that is part of a common development plan; or to transfer severable development rights to noncontiguous land in designated receiving districts. The term "severable development right" means the potential for the improvement or subdivision of part or all of a parcel of real property as permitted under the terms of a zoning and/or subdivision ordinance, expressed in dwelling unit equivalents or other measures of development density or intensity or a fraction or multiple of that potential that may be severed or detached.

Advance Right-of-Way Acquisition

There are sometimes cases where planning tools and ordinances are not applicable, development of property in a thoroughfare corridor is imminent, and the only recourse is the purchase of the property. For these special situations, a right-of-way fund is desirable that will enable the property to be purchased and held by the public agency until such time as the improvement project can be funded. An alternative to the full cost acquisition of the property is the purchase of a long term option to buy that will fix the future cost and prevent development in the corridor.

Development Reviews

The District Engineer's office and the Traffic Engineering Branch of the North Carolina Department of Transportation review driveway access to any state-maintained road. In addition, any development expected to generate large volumes of traffic (e.g., shopping centers, fast food restaurants, or large industries) should be comprehensively studied by the Traffic Engineering Branch and/or the Roadway Design Unit of NCDOT. If reviewed at an early stage, it is often possible to significantly improve the development's accessibility while preserving the integrity of the thoroughfare plan.

Direct Construction

Direct construction is an obvious means for implementing a plan, and there are a number of ways direct construction can be funded. These include 1) transit funds, 2) Rivers and Harbors Act of 1824, 3) Federal and State aid for Airport Development, 4) Federal-aid Highway Act, 5) Department of Defense funds, 6) State funds, and 7) local funding through local taxes, state-aid, or bonds.

Funding Sources

Local Programs

Local funding can be raised through local taxes, State-aid, or bonds. Impact fees are also an example of local means to help meet the area's transportation needs created by new development. Local officials can also require Developers to help with the construction of new facilities or upgrades that their developments make necessary.

Local Capital Improvements Program

The local capital improvements program, with respect to transportation, is a long-range plan for the spending of money on street improvements, acquisition of rights-of-way and other improvements within the bounds of projected revenues. A capital improvements program makes it easier to build a planned thoroughfare system. It consists of two lists of projects. The first is a list of highway projects that are to be implemented with municipal funds. The second is a list of local projects designated as State responsibility that are included in the Transportation Improvement Program. Only in special cases will a municipality be able to enjoy the benefits of highway improvements without some form of investment.

Federal Assistance

A local municipality can apply for federal assistance through housing, urban development, and economic development grants. These funds can be used to correct poor street design, layout, and other street problems.

Impact Fees

A municipality may levy impact fees on new development to pay for the appropriate portion of off-site infrastructure improvements made necessary as a result of that development. A municipality seeking to impose impact fees must receive that authority from the state legislature. Statutory restrictions require the fees be collected and spent within the area or district in which they are collected.

Municipal Service Districts

Under North Carolina General Statute, Chapter 160a, Sections 535-554, the legislative body of a municipality may create one or more municipal service districts in a downtown commercial area in order to raise additional funds for physical improvements. One purpose of the district could be to facilitate traffic flow and parking. The district may issue bonds that would be paid off with revenues from an extra ad valorem tax on all property within the district's boundaries. Once the improvements are completed and the bonds are retired, the extra taxation would cease and the district could be dissolved. Previously used for

erosion control, flood and hurricane protection works, downtown revitalization, drainage projects, and off-street parking. It can be used for transportation facilities.

General requirements are 1) a report or study that defines the district, documents the fact that the district meets the standards required of legislation, and a plan for providing the service; and 2) public hearing.

The advantages to using this means are 1) special treatment for the area, 2) assessing power, and 3) bond authorization.

Planned Unit Development (PUD)

A number of communities have planned unit development ordinances (PUD) which permit flexibility in design of larger developments with the overall design subject to review. The PUD ordinance, like the subdivision ordinance can require thoroughfare construction and right-of-way dedication in accordance with the thoroughfare plan. Since larger developments are usually involved in a PUD project, the likelihood is increased that some thoroughfare plan revisions will be necessary in order to ensure coordination.

State Funding Programs

Transportation Improvement Program

North Carolina's Transportation Improvement Program (TIP or STIP) is a financially constrained document that lists all major transportation projects, and their funding sources, planned by the NCDOT for a seven-year period. Every two years, when the TIP is updated, completed projects are removed, programmed projects are advanced, and new projects are added.

Once a project is identified on the mutually adopted Thoroughfare Plan, the next step for projects anticipated to be implemented with State and Federal funds is for the municipality to present it as a request at the TIP public hearings. During biennial TIP public hearings, municipalities, local citizen groups, and other interested parties request projects to be included in the TIP. The group requesting a particular project(s) should submit to the NCDOT Board of Transportation Member (BOT) representing their area the following: a letter with a prioritized summary of requested projects, TIP candidate project request forms, and project location maps with a description of each project.

Rural Planning Organizations (RPO's), in areas where they are established, will have a role in prioritizing projects and presenting the priorities' list to NC Board of Transportation.

The Board of Transportation reviews all of the project requests from each area of the State. Based on the technical feasibility, need, and available funding, the Board decides which projects will be included in the TIP. In addition to highway construction and widening, TIP funds are available for bridge replacement, highway safety projects, public transit projects, railroad projects, and bicycle facilities. Contact your Board of Transportation (BOT) Member. You can get your BOT Member's name by calling the Secretary to the Board of Transportation at (919) 733-2520 or by going to http://www.dot.state.nc.us/ clicking on "Board of Transportation" and then clicking on "Board Members".

Flow Chart 2 shows a flowchart detailing the biennial process for updating the TIP. As can be seen from the chart, the public hearings are held in the first year of the process.

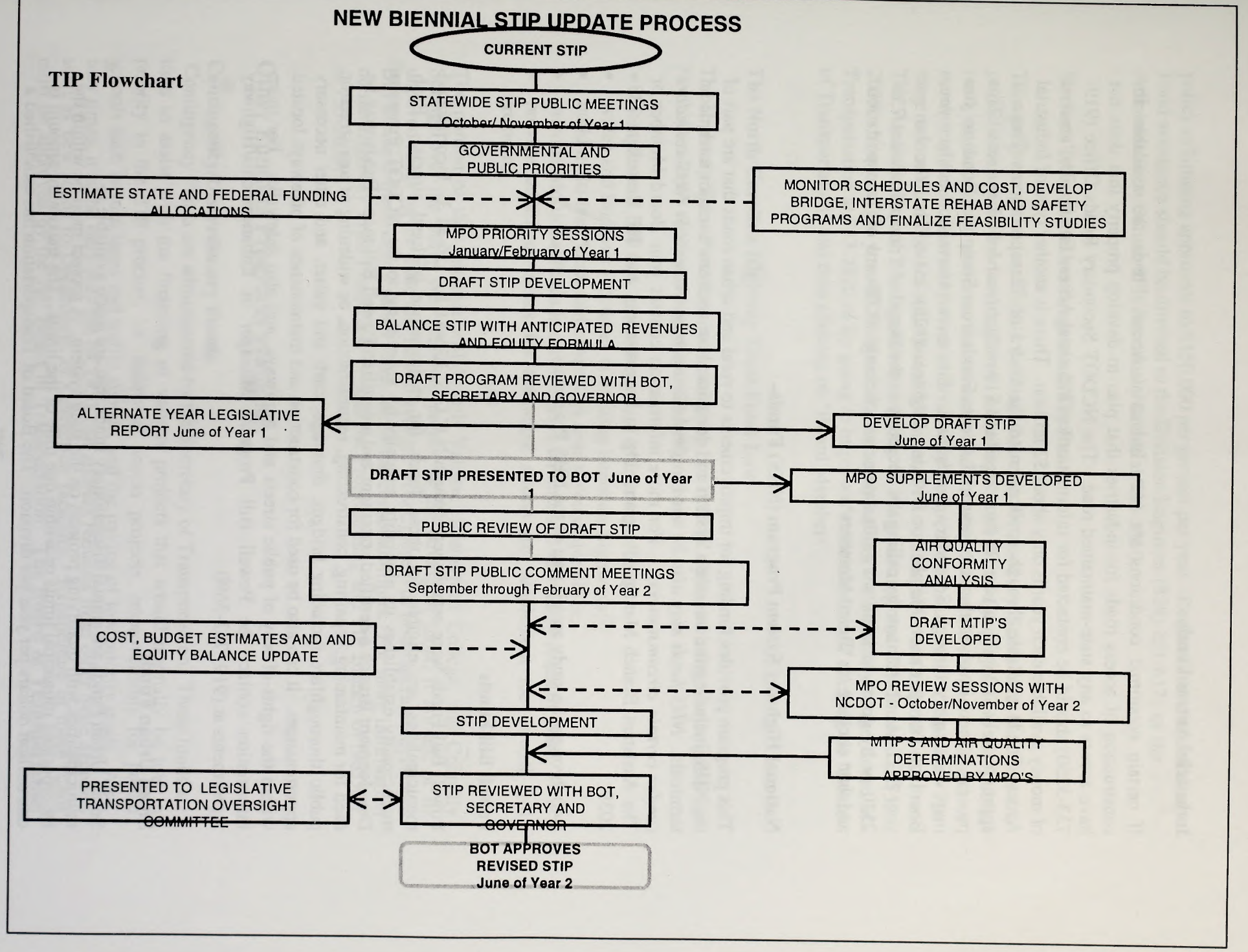
To obtain information on the date and location of the public hearing for your area, call the NCDOT Programming and TIP Branch at (919) 733-2039.

The following projects in the study area in the 2000-2006 TIP:

R-2824 - Lovelady Road - widening and extension
B-3621 - Micol Creek, replace Bridge No. 148 along SR 1547

Enhancement Program Funds

These funds are for enhancement projects that fall into one or more of the 11 categories to transportation enhancement activities specified by TEA-21. For a list of these areas you can call Programming and TIP Branch at 733-3690 or go to http://www.dot.state.nc.us/ and click on "Program Development", then click on "Enhancements, Agreements and Powell Bill", and finally click on "Transportation Enhancements". The project must demonstrate a strong and direct relationship to the intermodal transportation system. A legal agreement between the NCDOT and the sponsor outlining the responsibility of each party is necessary prior to funding. For more information contact the Enhancements/Agreements Administrator in Programming and TIP Branch at 733-3690. Anyone (an individual, group or government agency) as long as it is co-sponsored by a governmental entity is eligible. Transportation enhancement activities must relate to **surface transportation.** The sponsor must pay for at least 20% of the project cost.


NEW BIENNIAL STIP UPDATE PROCESS
TIP Flowchart
CURRENT STIP
STATEWIDE STIP PUBLIC MEETINGS
October/ November of Year 1
GOVERNMENTAL AND PUBLIC PRIORITIES
ESTIMATE STATE AND FEDERAL FUNDING ALLOCATIONS
MONITOR SCHEDULES AND COST, DEVELOP BRIDGE, INTERSTATE REHAB AND SAFETY PROGRAMS AND FINALIZE FEASIBILITY STUDIES
MPO PRIORITY SESSIONS
January/February of Year 1
DRAFT STIP DEVELOPMENT
BALANCE STIP WITH ANTICIPATED REVENUES AND EQUITY FORMULA
DRAFT PROGRAM REVIEWED WITH BOT, SECRETARY AND GOVERNOR
ALTERNATE YEAR LEGISLATIVE REPORT June of Year 1
DEVELOP DRAFT STIP
June of Year 1
DRAFT STIP PRESENTED TO BOT June of Year 1
MPO SUPPLEMENTS DEVELOPED
June of Year 1
PUBLIC REVIEW OF DRAFT STIP
AIR QUALITY CONFORMITY ANALYSIS
DRAFT STIP PUBLIC COMMENT MEETINGS
September through February of Year 2
DRAFT MTIP'S DEVELOPED
COST, BUDGET ESTIMATES AND AND EQUITY BALANCE UPDATE
MPO REVIEW SESSIONS WITH NCDOT - October/November of Year 2
STIP DEVELOPMENT
MTIP'S AND AIR QUALITY DETERMINATIONS APPROVED BY MPO'S
PRESENTED TO LEGISLATIVE TRANSPORTATION OVERSIGHT COMMITTEE
STIP REVIEWED WITH BOT, SECRETARY AND GOVERNOR
BOT APPROVES REVISED STIP
June of Year 2

Industrial Access Funds

If certain economic conditions are met, Industrial Access Funds are available for construction of access roads for industries that plan to develop property that does not have access to any state-maintained road. The NCDOT Secondary Roads Office (919-733-3250) should be contacted for information on Industrial Access Funds. The amount of money available each year is only about $2 million. There is another type of Industrial Access Funds available through application to the Board of Transportation. There is approximately $10 million/year for rural areas and $10 million/year for urban areas. This process is more involved than the Industrial Access Funds from Secondary Roads so you may want to try through Secondary Roads first. For more information contact your Board of Transportation Member or Division Engineer (828) 251-6171. You can get your BOT Member's name by calling the Secretary to the Board of Transportation at 733-2520 or by going to http://www.dot.state.nc.us/ clicking on "Board of Transportation" and then clicking on "Board Members".

National Highway System Program (NHS) Funds–

This program provides funding for improvements to rural and urban roads that are part of the NHS, including the Interstate System and designated connections to major intermodal terminals. *NHS funds may also be used to fund transit improvements in NHS corridors (under certain circumstances).* For more information contact your Board Member or The Assistant Branch Manager-Programming in Programming and TIP Branch at 733-2039.

I-40 through the study area is part of the NHS Program.

Powell Bill Funds

Powell Bill Funds were established through N.C.G.S. 136-41.1 - 136-41.3. Incorporated municipalities are eligible for these funds for maintenance of local streets. Each municipality establishes its eligibility annually by submitting to the NCDOT Program Development Branch a certified statement and a certified Powell Bill map. Funds may be used for maintaining, repairing, constructing, reconstruction, or widening of any street or public thoroughfare including bridges, drainage, curb and gutter, and other necessary appurtenances. It can also be used for construction and maintenance of bikeways located within the rights-of-way of public streets and highways, and also sidewalks. For more information contact the Powell Bill Program Manager in Enhancements/Highway Agreements at (919) 733-3690.

Small Urban Funds

Small Urban Funds are annual discretionary funds that are made available to municipalities with qualifying projects on the state system. A project must be within the incorporated municipal limits or within one mile of the limits. The maximum amount is one million dollars per year per division. The Board of Transportation has established a

policy of limiting approvals to $150,000 per project per year. Requests for Small Urban Fund assistance should be directed to the Division Engineer (828) 251-6171 or the Administration Officer II in Secondary Roads at 733-3250.

Surface Transportation Program (STP) Funds

This program provides flexible funding that may be used by States and localities for projects on any Federal-aid highway, including the NHS, bridge projects on any public road, transit capital projects, and intracity and intercity bus terminals and facilities. *A portion of funds reserved for rural areas may be spent on rural minor collectors.* For more information contact your Board Member, Division Engineer at (828) 251-6171, or The Assistant Branch Manager-Programming in Programming and TIP Branch at 733-2039. You can get your BOT Member's name by calling the Secretary to the Board of Transportation at 733-2520 or by going to http://www.dot.state.nc.us/ clicking on "Board of Transportation" and then clicking on "Board Members".

The North Carolina Highway Trust Fund Law

The Highway Trust Fund Law was established in 1989 as a plan with four major goals for North Carolina's roads and highways. These goals are:

- complete a 3,600 mile intrastate system of four-lane roads;
- widen and improve 113 miles of existing interstate highways;
- build multi-lane loops and connectors near seven major cities;
- provide additional funds in order to pave all unpaved secondary roads by 2006;
- provide additional funds for municipal streets (to supplement the Powell Bill Program)

The portion of this bill that will benefit Valdese, Rutherford College, and Connelly Springs over the thirty year planning period, is the paving of most, if not all, of its unpaved roads on the State maintained system. Also, there will be an increase in Powell Bill Funds if these newly paved roads are in the corporate limits. For more information on the Highway Trust Fund Law, contact the Programming and TIP Branch of NCDOT at 733-2039.

Other Funding Programs available:

Contingency/Discretionary Funds

Contingency Funds are administered by the Secretary of Transportation. These funds are used to assist with the financing of various projects that would normally be low in priority in the TIP process, i.e. industrial access projects, improvements for public schools such as turn lanes and traffic signals, and the paving of low priority roads. Also, may times, it is the only way the NCDOT can address requests from other State agencies such as new roads to Department of Correction facilities. Expenditure of these funds must be approved by the full Board of Transportation. **The Board of Transportation**

has established a $150,000 limit per project. Basically, expenditure guidelines for these funds are identical to guidelines for the Division-wide Small Urban Funds.

Requests for Statewide Contingency Funds will be received from municipalities, counties, businesses, schools, citizens, and legislative members, and NCDOT staff. All requests must be submitted in writing to the Secretary of Transportation and include a clear description and a justification of the project. Contact your Board of Transportation Member if there is a project you want considered. You can get your BOT Member's name by calling the Secretary to the Board of Transportation at 733-2520 or by going to http://www.dot.state.nc.us/ clicking on "Board of Transportation" and then clicking on "Board Members".

Implementation Recommendations

The following table provides a break down of the projects recommended in the Valdese-Rutherford College-Connelly Springs Thoroughfare Plan and the corresponding programs that could best suit the implementation of the given project.

Table 1

FUNDING SOURCES AND METHODS RECOMMENDED FOR IMPLEMENTATION OF PROJECTS							
	Funding Sources				**Methods of Implementation**		
Projects	Local Funds	TIP Funds	Indust. Access	Small Urban	Subdiv. Ord.	Zoning Ord.	Development Review
I-40		X					
US 70		X				X	X
Eldred St.	X	X			X		
Lovelady Rd. Ext.		X					
Malcolm Blvd./ Rutherford College Rd	X	X			X	X	X
Meytre Ave.		X	X		X		
St. Germain Ave.		X	X		X	X	X
Southwest Loop (1726 Ext)		X			X		
Woodlawn Drive	X	X			X	X	X

Construction Priorities and Cost Estimates

Construction priorities will vary depending on what criteria are considered and what weight is attached to the various criteria. Most people would agree that improvements to the major thoroughfare system and major traffic routes would be more important than minor thoroughfares where traffic volumes are lower. To be in the North Carolina Transportation Improvement Program, a project must show favorable benefits relative to costs and should not be prohibitively disruptive to the environment. The potential cost estimates of seven projects with respect to the user benefits are given in Table 2.

Reduced road user cost should result from any roadway improvement, from a simple widening to the construction of a new roadway. Roadway improvements should also relieve

congested or unsafe conditions. Comparisons of the existing and the proposed facilities have been made in terms of vehicle operating costs, travel time costs, and accident costs. These user benefits are computed as total dollar saving over the 30 year design period using data such as project length, base year and design year traffic volumes, traffic speed, type of facility, and volume capacity ratio.

Table 2

BENEFITS EVALUATION FOR MAJOR PROJETS				
Projects	Benefits (millions)	Costs (millions)	Length (miles)	Benefits (millions)
I-40	142	38.6	5.34	26.6
US 70	23.8	3.0	1.14	20.1
Eldred Street	16.3	5.2	1.02	16.0
Malcolm Blvd.	87.9	11.3	2.73	32.2
Meytre Ave.	47.1	4.1	1.00	47.1
St. Germain Ave.	27.6	2.2	0.80	34.5

Offsetting the benefits that would be derived from any project is the cost of its construction. A new facility, despite its high projected benefits, might prove to be unjustified due to the excessive costs involved in construction, environmental impacts, or social impacts. The highway costs estimated in this report are based on the average statewide construction costs for similar project types. The anticipated right-of-way costs is also included as an average cost per acre for property throughout the Planning Area according to the respective project. Table 3 provides a break down of total project cost into construction cost and right-of-way cost for the major project proposals for the thoroughfare plan.

Table 3

POTENTIAL PROJECT COST ESTIMATES FOR MAJOR PROJECTS			
Project Description	Construction Cost	Right-of-way Cost	Total Cost
I-40	$38,600,000	$ 32,000	$38,632,000
US 70	$ 2,600,000	$ 350,000	$ 2,950,000
Eldred Street	$ 3,500,000	$1,700,000	$ 5,200,000
Malcolm Blvd.	$ 9,100,000	$2,100,000	$11,200,000
Meytre Ave.	$ 3,740,000	$ 300,000	$ 4,040,000
St. Germain Ave.	$ 600,000	$1,700,000	$ 2,300,000

CHAPTER 4

ANALYSIS OF THE STUDY AREA'S ROADWAY SYSTEM

This chapter presents an analysis of the ability of the existing street system to serve the area's travel desires. Emphasis is placed not only on detecting the deficiencies, but also on understanding their cause. Travel deficiencies may be localized and the result of substandard highway design, inadequate pavement width or intersection controls. Alternately, the underlying problem may be caused by a system deficiency such as a need for a bypass, loop facility, construction of missing links, or additional radials.

An analysis of the roadway system must first look at existing travel patterns and identify existing deficiencies. This includes roadway capacity and safety analysis. Also in an urban area, a street's ability to move traffic is generally controlled by the spacing of major intersections, access control, width of pavement, and the traffic control devices (such as signals) utilized.

After the existing picture of travel in the area has been developed, the engineer must analyze factors that will impact the future system. These factors include forecasted population growth, economic development potential, and land use trends. This information will be used to determine future deficiencies in the transportation system.

Capacity Analysis of the Existing System

An indication of the adequacy of the existing street system is a comparison of traffic volumes versus the ability of the streets to move traffic freely at a desirable speed. The ability of a street to move traffic freely, safely, and efficiently with a minimum delay is controlled primarily by the number of lanes and the spacing of major devices utilized. Thus, the ability of a street to move traffic can be increased by restricting parking and turning movements, using proper sign and signal devices, and by the application of other traffic engineering strategies.

Capacity is the maximum number of vehicles that has a "reasonable expectation" of passing over a given section of a roadway, during a given time period under prevailing roadway and traffic conditions. The relationship of traffic volumes to the capacity of the roadway will determine the level of service (LOS) being provided. There are six levels of service for analysis purposes. They are given letter designations from A to F with LOS A representing the best operating conditions and LOS F the worst. LOS D is often called the "practical capacity". Thoroughfare Plan recommendations are based on achieving, as a minimum, LOS D for the existing facilities in the design year.

The six levels of service are illustrated in Figure 4, and they are defined on the following pages. The definitions are general and conceptual in name, but may be applied to urban arterial levels of service. Levels of service for interrupted flow facilities vary widely in terms of both the user's perception of service quality and the operational variables used to describe them. The 1995 Highway Capacity Manual contains more detailed descriptions of the levels of service as defined for each facility type.

Level of Service

LOS A

Describes primarily free flow conditions. The motorist experiences a high level of physical and psychological comfort. The effects of minor incidents of breakdown are easily absorbed. Even at the maximum density, the average spacing between vehicles is about 528 ft, or 26 car lengths.

LOS B

Represents reasonably free flow conditions. The ability to maneuver within the traffic stream is only slightly restricted. The lowest average spacing between vehicles is about 330 ft, or 18 car lengths.

LOS C

Provides for stable operations, but flows approach the range in which small increases will cause substantial deterioration in service. Freedom to maneuver is noticeably restricted. Minor incidents may still be absorbed, but the local decline in service will be great. Queues may be expected to form behind any significant blockage. Minimum average spacings are in the range of 220 ft, or 11 car lengths.

LOS D

Borders on unstable flow. Density begins to deteriorate somewhat more quickly with increasing flow. Small increases in flow can cause substantial deterioration in service. Freedom to maneuver is severely limited, and the driver experiences drastically reduced comfort levels. Minor incidents can be expected to create substantial queuing. At the limit, vehicles are spaced at about 165 ft, or nine car lengths.

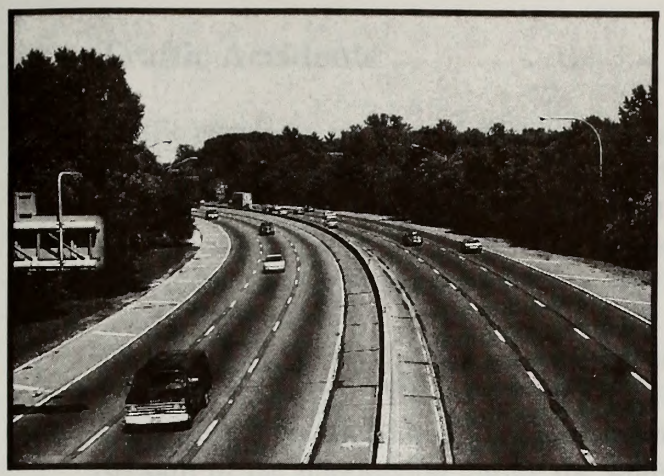
LOS E

Describes operation at capacity. Operations at this level are extremely unstable, because there are virtually no usable gaps in the traffic stream. Any disruption to the traffic stream, such as a vehicle entering from a ramp, or changing lanes, requires the following vehicles to give way to admit the vehicle. This can establish a disruption wave that propagates through the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate any disruption. Any incident can be expected to produce a serious breakdown with extensive queuing. Vehicles are spaced at approximately six car lengths, leaving little room to maneuver.

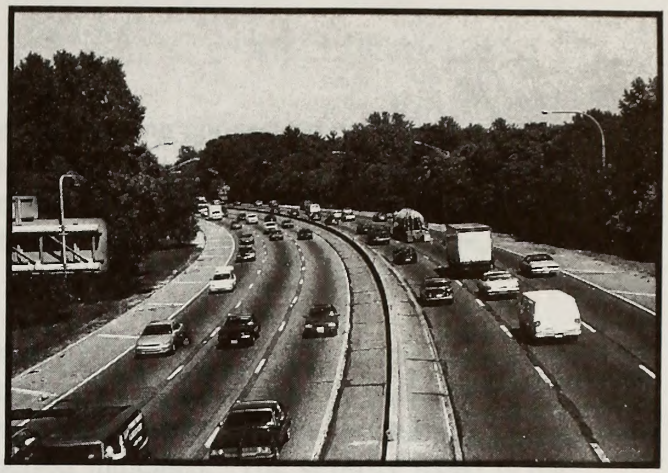
LOS F

Describes forced or breakdown flow. Such conditions generally exist within queues forming behind breakdown points.

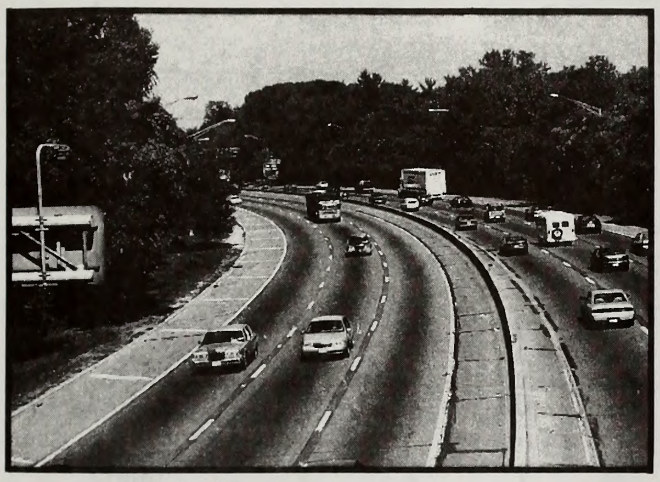
Source: 1994 Highway Capacity Manual



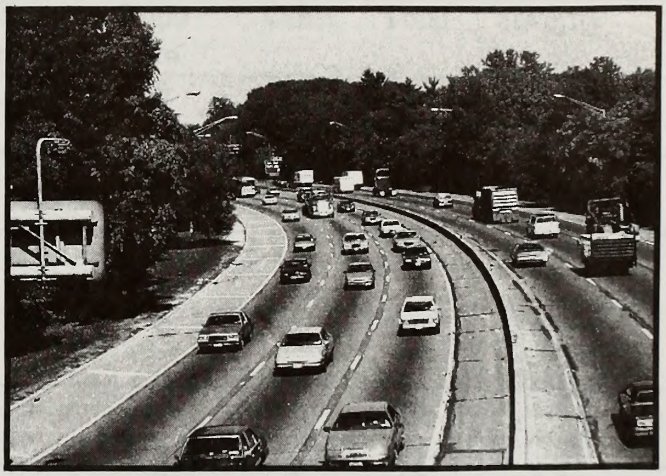
LOS A.



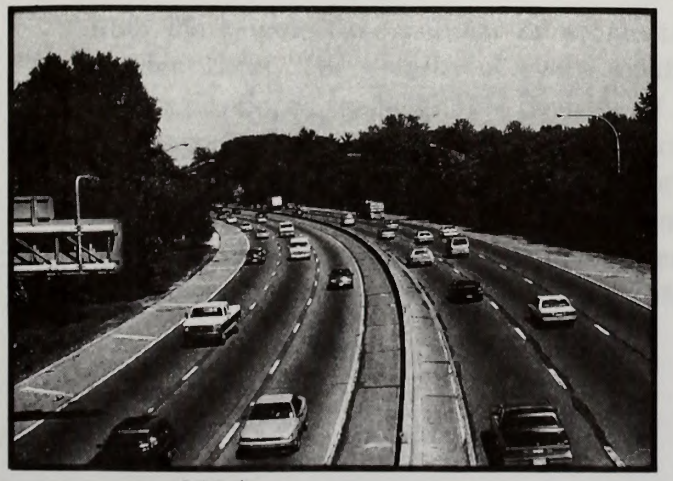
LOS D.



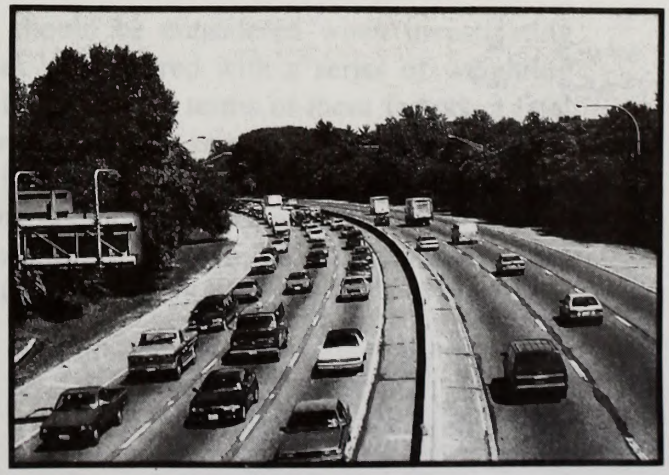
LOS B.



LOS E.



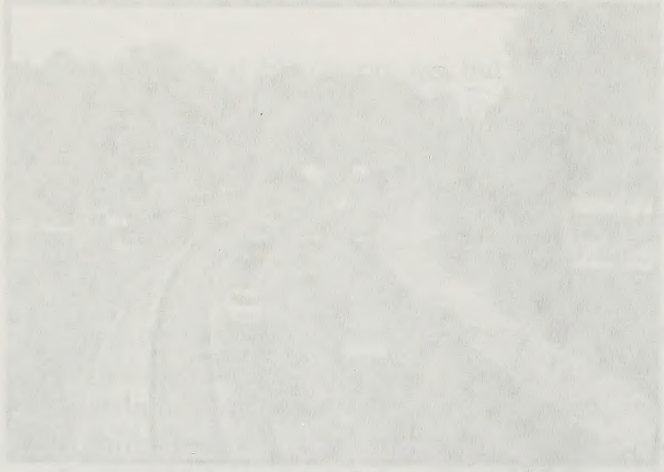
LOS C.

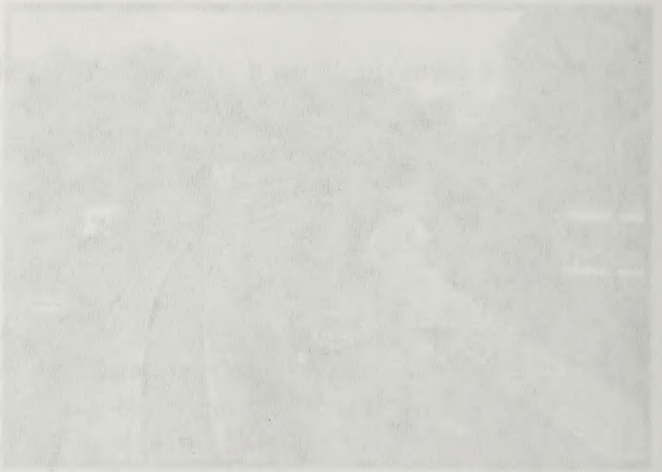


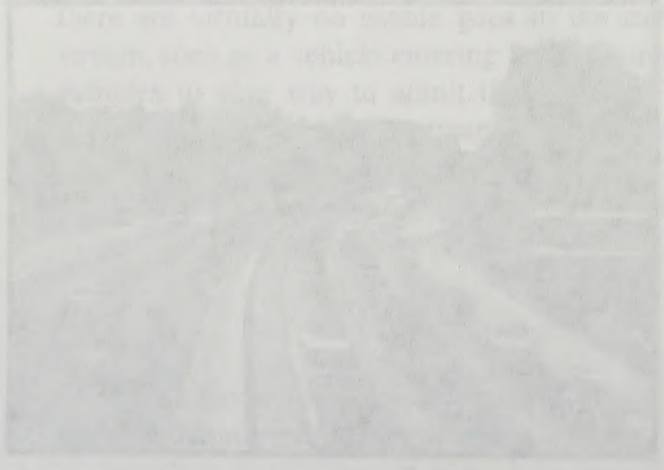
LOS F.

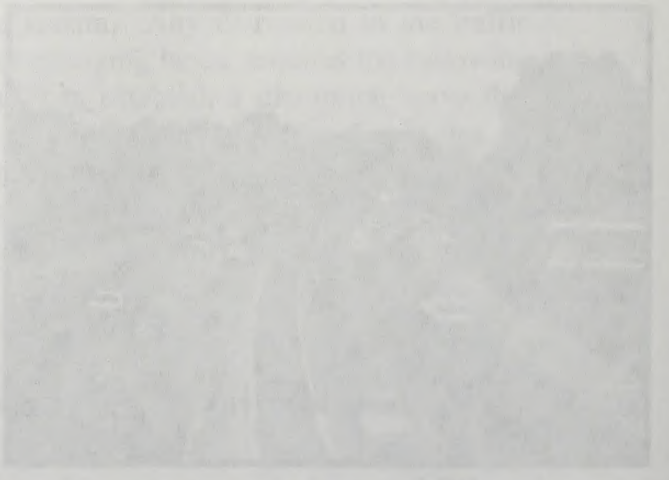
LEVELS OF SERVICE

FIGURE 4









Traffic Accidents

Traffic accidents are often used as an indicator for locating congestion problems. Traffic accident records can also be reviewed to identify problem locations or deficiencies such as poor design, inadequate signing, ineffective parking, or poor sight distance. Accident patterns developed from analysis of accident data can lead to improvements that will reduce the number of accidents.

Table 4 is a summary of the accidents occurring in the Planning Area between January 1993 and December 1996. This table only includes locations with 10 or more accidents. The "Total" column indicates the total number of accidents reported within 200 ft (61.0m) of the intersection during the study period indicated. The severity listed is the average accident severity for that location.

Table 4

Location with 10 or more accidents in a 3-year period

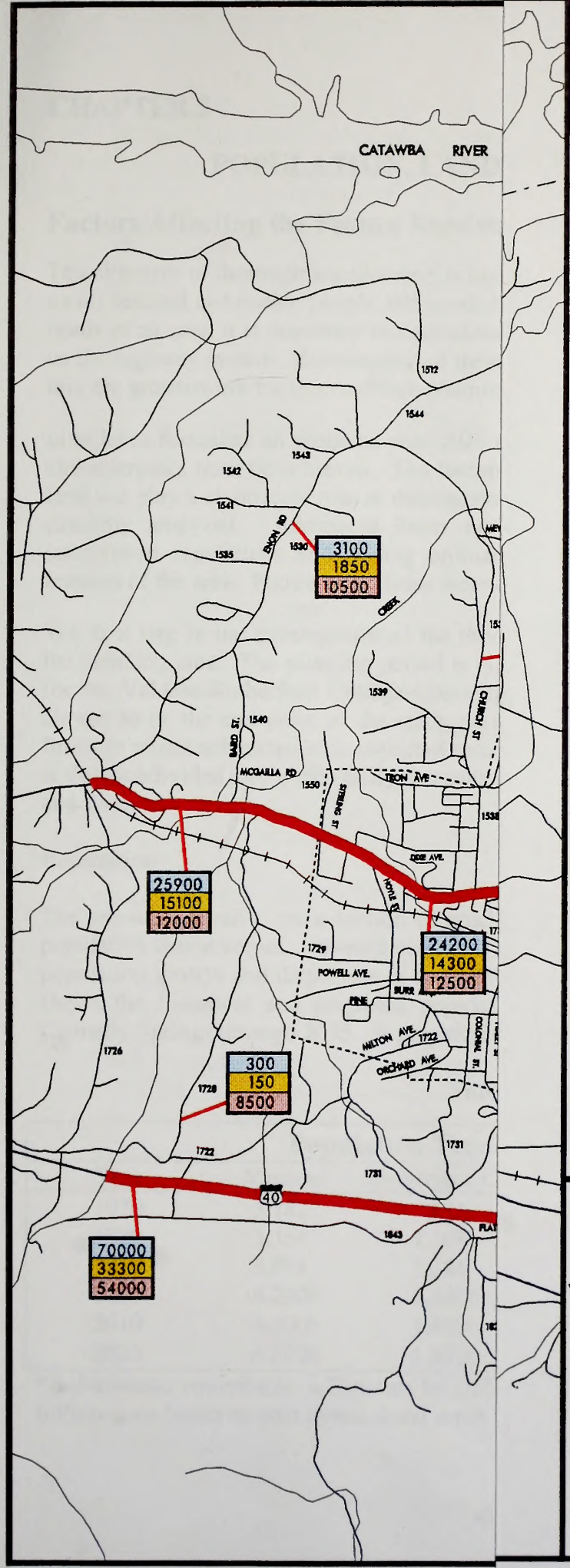
Location	Angle	Rear End	Ran Off Road	Left Turn	Right Turn	Other	Total	Severity
I-40/ Malcolm	5	7	4	3	0	1	20	3.2
US 70/ Malcolm	5	7	0	4	0	1	17	7.2
US 70/ Israel	0	7	2	1	0	1	11	11.3
Faet/ Main	1	6	0	0	1	2	10	3.2
Hoyle/ s	0	12	0	4	1	1	18	4.3
Main/ Praley	3	5	1	0	2	2	13	2.7
Main/ Rodoret	2	9	0	0	0	1	12	4.1

Both the severity and number of accidents should be considered when investigating accident data. The severity of every accident is measured with a series of weighting factors developed by NCDOT's Division of Highways. In terms of these factors, a fatal or incapacitating accident is 47.7 times more severe than one involving only property damage, and an accident resulting in minor injury is 11.8 times more severe than one with only property damage. To request a more detailed accident analysis for any of the above mentioned intersections, or other intersection of concern, the City should contact the Division 13 Traffic Engineer at (828) 298-0094.

1995/2025 Traffic Capacity Analysis

Capacity Deficiencies – Figure 5 depicts the base year major street system, the 1995 ADT (Average Daily Traffic), 2025 volumes anticipated without any road improvements, and existing capacities. A comparison of the base year ADT to capacities reveals that a section of US 70 (Main Street) is near or over practical capacity (LOS D). This area is highlighted: US 70 (Main Street), from the western Planning Area Boundary (PAB) to Laurel Street, is currently over or near design capacity. The capacity on this section is approximately 12,000 vpd (vehicles per day). Currently there are approximately 16,250 vpd using the section between the western PAB and Laurel Street. By the year 2025, if no improvements are made to the existing system, this volume is expected to increase to 26,000 vpd.

No Build Alternative: - Not implementing a thoroughfare plan or elements of it could be called a "No-Build Alternative." This means that there would be no new construction or roadway improvements to the current thoroughfare system except for routine maintenance. If no improvements are made to I-40, US 70, Malcolm Boulevard, and Lovelady Road during the planning period, the increase in traffic volumes and normal growth will result in a dramatic reduction in transportation quality. The LOS will drop, operating speed will drop significantly, and the queues of traffic currently experienced behind slow moving vehicles will get considerably longer and safety reduced. The absence of improvements will negatively impact growth, safety, and business in the planning area. Figure 5 shows the existing system, assuming that no improvements, beyond what is currently in the State TIP, are made by the design year.



2025 CAPACITY ANALYSIS

LEGEND

AT OR OVER CAPACITY(V/C ≥ 1.00)

NEAR CAPACITY(0.8 ≤ V/C ≤ 1.00)

TIP R-2617

TIP R-2824

2025 ADT
1995 ADT
EXISTING & COMMITTED CAPACITY

0000
0000
0000

N

S

Figure 5

VALDESE-RUTHERFORD COLLEGE-CONNELLY SPRINGS
BURKE COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH

IN COOPERATION WITH THE
U.S.DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

0 1000 2000 3000 4000
feet

BASE MAP SOURCE

1995/2025 Traffic Capacity Analysis

Capacity Deficiencies – Figure 5 depicts the base year major street system, the 1995 ADT (Average Daily Traffic), 2025 volumes anticipated without any road improvements, and existing capacities. A comparison of the base year ADT to capacities reveals that a section of US 70 (Main Street) is near or over practical capacity (LOS D). This area is highlighted: US 70 (Main Street), from the western Planning Area Boundary (PAB) to Laurel Street, is currently over or near design capacity. The capacity on this section is approximately 12,000 vpd (vehicles per day). Currently there are approximately 16,250 vpd using the section between the western PAB and Laurel Street. By the year 2025, if no improvements are made to the existing system, this volume is expected to increase to 26,000 vpd.

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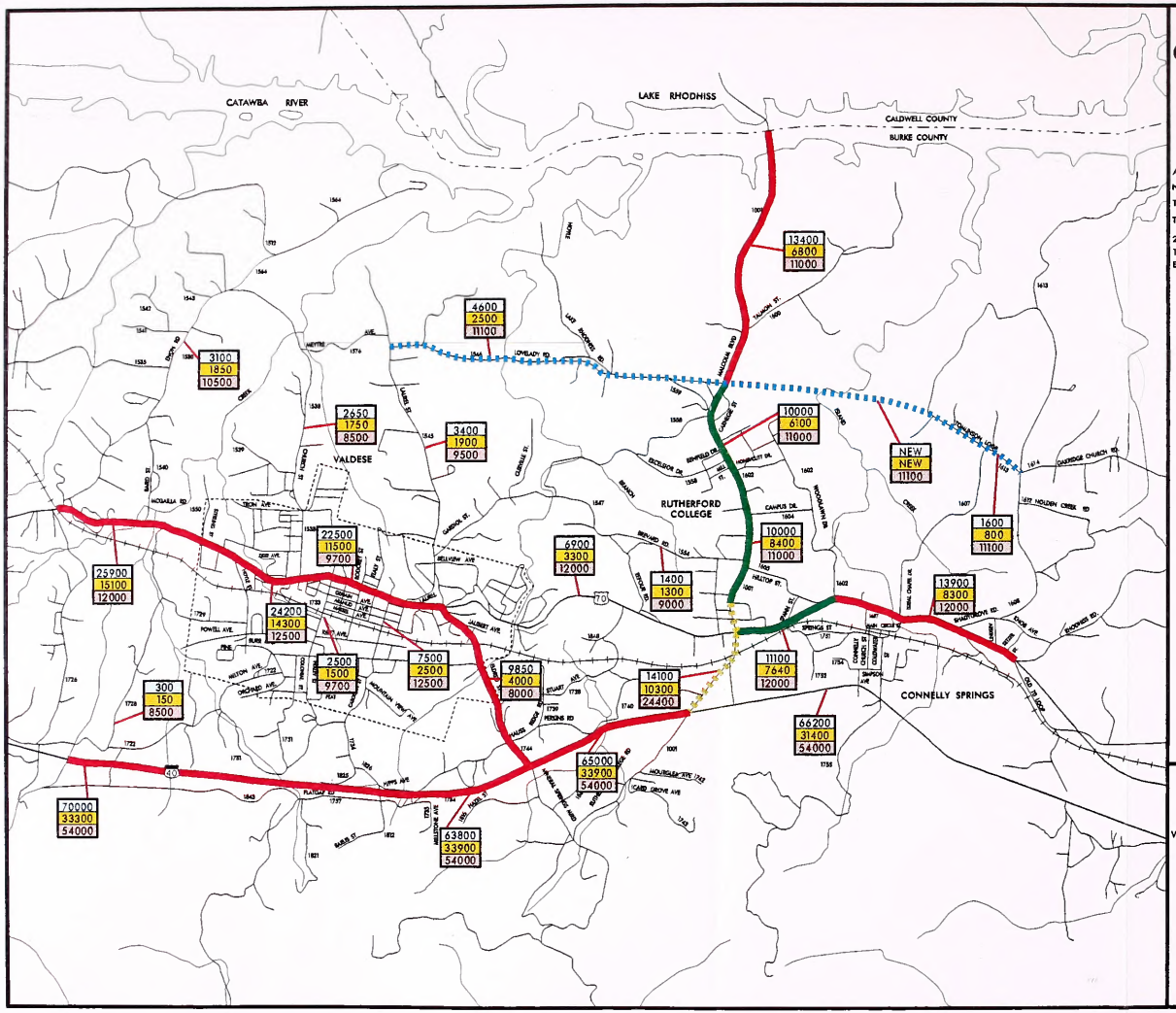


2025 CAPACITY ANALYSIS

LEGEND

AT OR OVER CAPACITY(V/C ≥ 1.00)

NEAR CAPACITY(0.8 ≤ V/C ≤ 1.00)

TIP R-2617

TIP R-2824

2025 ADT	0000
1995 ADT	0000
EXISTING & COMMITTED CAPACITY	0000

Figure 5

VALDESE-RUTHERFORD COLLEGE-CONNELLY SPRINGS
BURKE COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH

IN COOPERATION WITH THE
U.S.DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

0 1000 2000 3000 4000
feet

CHAPTER 5

POPULATION, LAND USE, AND TRAFFIC

Factors Affecting the Future Roadway System

The objective of thoroughfare planning is to develop a transportation system that will meet future travel demand and enable people and goods to travel safely and economically. To determine the needs of an area, it is important to understand the role population, economics, and land use have on the highway system. Examination of these factors helps to explain historic travel patterns and lays the groundwork for thoroughfare planning.

In order to formulate an adequate year 2025 thoroughfare plan, reliable forecasts of future travel characteristics must be achieved. The factors of population, vehicle usage trends, economy and land use play a significant role in determining the transportation needs of the area, and must be carefully analyzed. Additional items may include the effects of legal controls such as subdivision regulations and zoning ordinances, availability of public utilities and physical features of the area. Future projections were done by the local staff in conjunction with NCDOT.

The first step in the development of the thoroughfare plan is to define the planning period and the planning area. The planning period is typically on the order of 25-30 years. The base year for the Valdese-Rutherford College-Connelly Springs study was 1996, and the year 2025 was chosen to be the end point of the study period (29 years). The planning area is generally the limits to which urbanization is expected to occur during the planning period. The planning area is then subdivided into traffic analysis zones (TAZ). Figure 6 shows the planning area boundary and zones.

Population

The amount of traffic on a section of roadway is a function of the size and location of the population that it serves. Investigating past trends in population growth and forecasting future population growth and dispersion is one of the first steps for a transportation planner. Table 5 shows the historical and projected population trends for Valdese, Rutherford College, and Connelly Springs through 2025. A graphical illustration of the population is shown in Figure 7.

Table 5

Population Trends and Projections				
Year	Valdese	Rutherford College	Connelly Springs	Burke County
1970	3,182	821	*	60,364
1980	3,364	1,108	*	72,504
1990	3,914	1,126	1,349	75,740
2000	4,200b	1,320b	1,390b	85,826a
2010	4,600b	1,480b	1,430b	92,480a
2020	4,880b	1,620b	1,470b	95,890a

*/Information unavailable **a**/Estimate by Office State Budget and Management
b/Projection based on past trends, local input

The most important population estimate for development of the thoroughfare plan is that of the planning area. Even though government census data is not available for the transportation planning area, other methods of estimation of population are available. The 1996 housing "windshield" survey for this study area gave a final count of 3,810 homes inside the Valdese-Rutherford College-Connelly Springs Planning Area. The housing count was then multiplied by the average persons per dwelling unit for the planning area (2.41) to give a total planning area population of 9,182. Population projections are shown in Table 6.

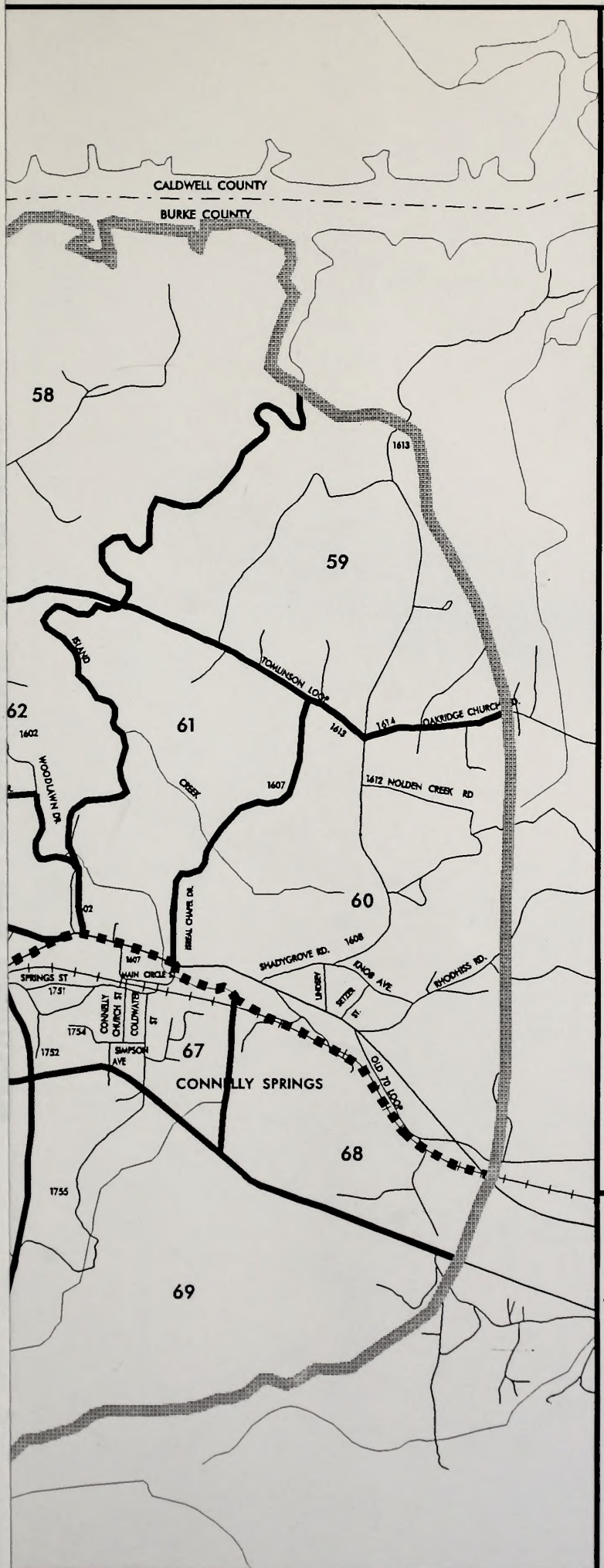
Table 6

Valdese-Rutherford College-Connelly Springs Planning Area Population Forecasts	
Year	Population
1996	9,182
2000	10,680
2010	11,349
2020	12,060
2025	12,432

Economy and Employment

One of the more important factors to be considered in estimating the future traffic growth of an area is its economic base. The number of employers and the employee's income or purchasing power influences how much population can be supported in the area and the number of motor vehicles that will be locally owned and operated. Generally, as the family income increases so does the number of vehicles owned, as well as the number of vehicle trips generated per day by each household. An accurate projection of the future economy of the area is essential to estimating future travel demand.

Factors which will influence economic growth and development in the Towns of Valdese-Rutherford College-Connelly Springs over the 29 year planning period is development along the I-40, US 70, the Industry Drive corridors, and in the downtown area(s). The working population of Valdese, Rutherford College, and Connelly Springs is mainly a mixture of industrial and service industries. These types of employment employ approximately 90% of the working population of Valdese, Rutherford College, and Connelly Springs. Table 7: *Employment Breakdown for Valdese-Rutherford College-Connelly Springs* was developed using the sum of the estimated jobs of each employer for 1996.



ZONE MAP

LEGEND

CORDON LINE

SCREEN LINES

ZONE LINE

ZONE NUMBER 00

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Figure 6

VALDESE–RUTHERFORD COLLEGE–CONNELLY SPRINGS
BURKE COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH

IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

0 1000 2000 3000 4000
feet

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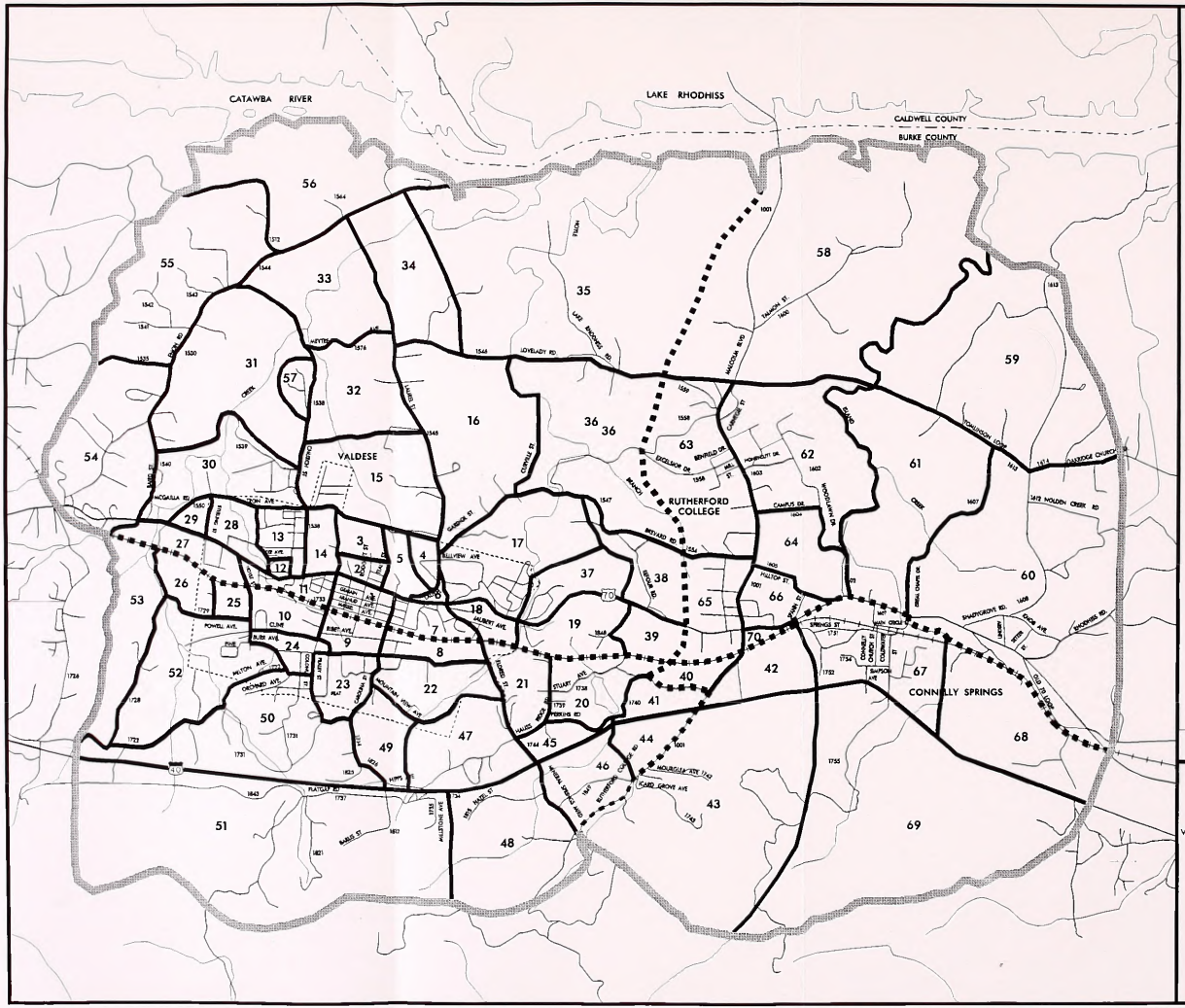

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BURKE COUNTY
NORTH CAROLINA

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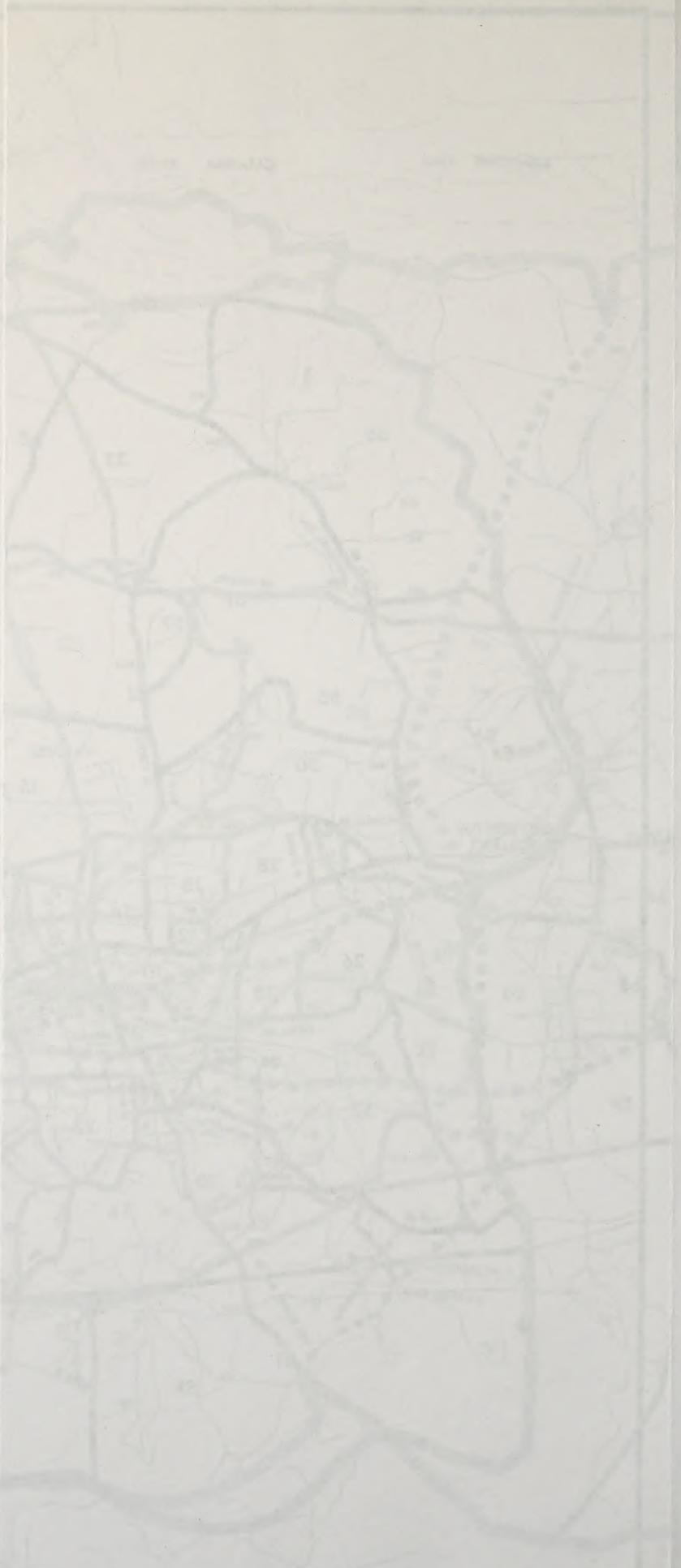


Figure 7
Planning Area Population Projections

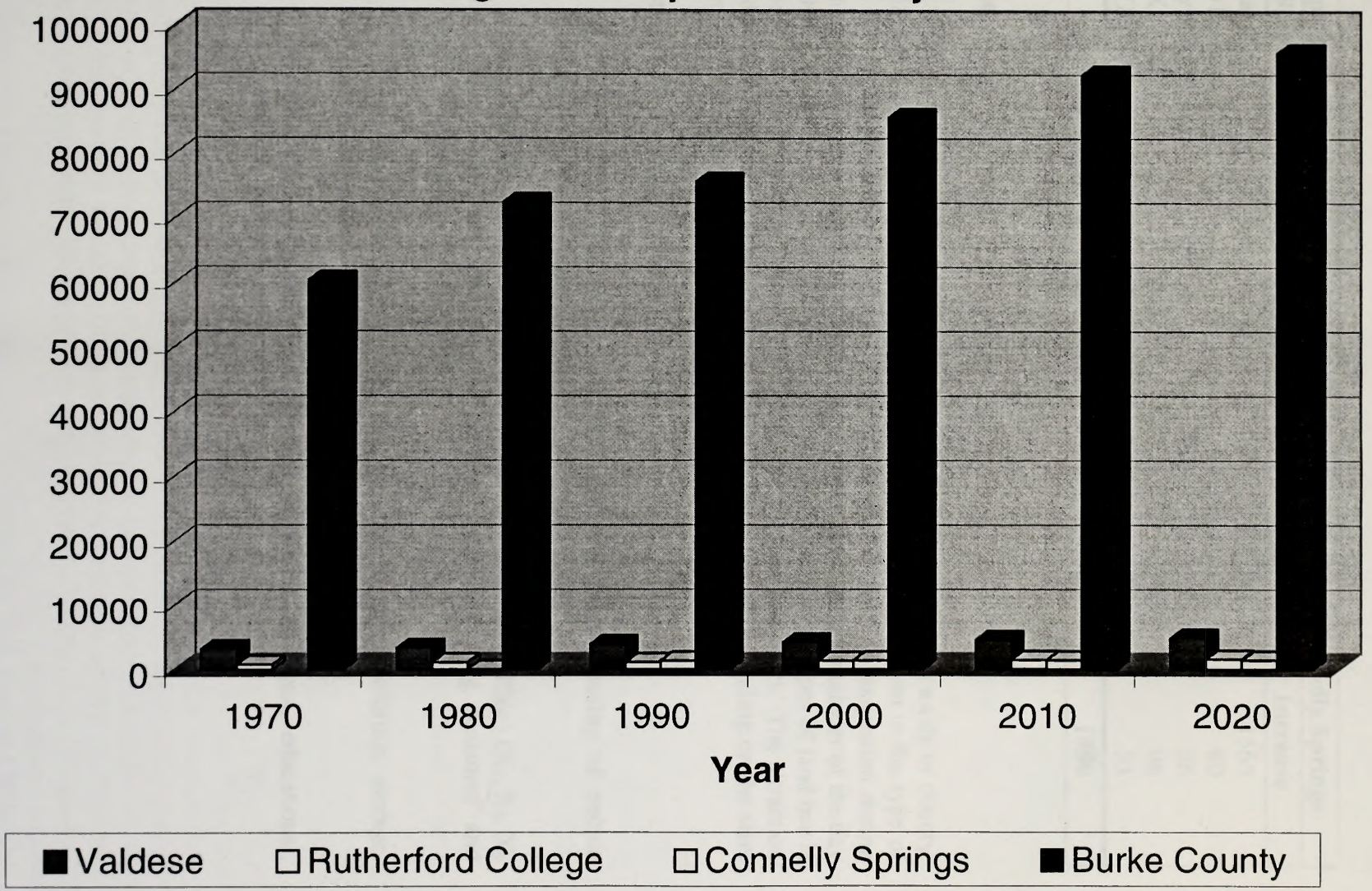


Table 7

Employment Breakdown for Valdese-Rutherford College-Connelly Springs				
Type of Business	**Percentage**	**1996**	**2025**	**Increase**
Industrial (X_1)	72	4635	6200	1565
Retail,Wholesale (X_2)	4	264	344	80
Highway Retail (X_3)	4	269	325	56
Office ($X_5 + X_8$)	18	1175	1271	96
Service (X_4)	2	110	163	53
Total	**100**	**6453**	**8303**	**1850**

Land Use

Land use refers to the physical patterns of activities and functions within a city or county. Nearly all traffic problems in a given area can be attributed in some form to the type of land use. For example, a large industrial plant might be the cause of congestion during shift change hours as its workers come and go. However, during the remainder of the day few problems, if any, may occur. The spatial distribution of different types of land use is the predominant determinant of when, where, and why congestion occurs. The attraction between different land uses and their association with travel varies depending on the size, type, intensity, and spatial separation of each.

For this study land uses were grouped into the following categories:

1. RESIDENTIAL (X_{12}) – all land devoted to the housing of people (excludes hotels and motels)

2. RETAIL (Includes Wholesale, Highway Retail, and Office) (X_2, X_3, X_5 and X_8) - all land devoted to retail trade including consumer and business service and office

3. INDUSTRIAL (X_1) – all land devoted to manufacturing, storage, warehousing, and transportation of products

4. SERVICE (X_4)– all land devoted to social, religious, educational, cultural, and political activities.

Anticipated future land use is a logical extension of the present spatial distribution. Determination of where expected growth is to occur within the planning area aids in determining the location of proposed thoroughfares or the improvements of existing thoroughfares. Areas of anticipated development and growth for Valdese-Rutherford College-Connelly Springs are:

1. RESIDENTIAL – A large amount of the residential land development is located throughout the southern and western portions of the planning area. The potential for new residential development can be found in the eastern and northern sections of the planning area.

2. RETAIL (Includes Wholesale, Highway Retail, and Office) – Most of the commercial development in Valdese is located along US 70 in the downtown area. For Rutherford College and Connelly Springs, much of the commercial development is located along Malcolm Boulevard (SR 1001) and also at the interchange with I-40 and SR 1001.

3. INDUSTRIAL – The industrial development in the planning area is located in several locations: one is along Lovelady Road (SR 1545) in the north and at various locations along US 70. The potential for new industrial development can be found again in these areas, especially Lovelady Road.

4. SERVICE – There are several public areas within the planning area. The Town of Valdese public offices are located on Faet Street adjacent to Main Street (US 70), as well as park land on Meytre Avenue in the northern part of the planning area. Rutherford College Town Hall is located on Malcolm Boulevard (SR 1001), Connelly Springs Town Hall is located on US 70. There are many religious facilities scattered throughout the planning area.

Future Travel Demand

Travel demand is generally reported in average daily traffic counts. The North Carolina Department of Transportation takes traffic counts regularly in and around Valdese, Rutherford College, and Connelly Springs. To estimate future travel demand, traffic trends over the past twenty years were studied. A comparison of annual growth rates from 1970 to 1996 at various count locations shows the average annual growth rates ranging from 0.1% to 4.6%. The largest growth was noted on mid-volume roads, where a given increase will result in a high percentage. Figure 5 shows existing and expected traffic volumes (obtained from the model) for the Valdese-Rutherford College-Connelly Springs Planning Area. The introduction of new residential and commercial developments in the planning area will cause increases in traffic growth in those immediate areas. Eventually, this increase will level off and follow the growth pattern of the surrounding area.

CHAPTER 6

ENVIRONMENTAL CONCERNS

In the past several years, environmental considerations associated with highway construction have come to the forefront of the planning process. The legislation that dictates the necessary procedures regarding environmental impacts is the National Environmental Policy Act. Section 102 of this act requires the execution of an environmental impact statement, or EIS, for road projects that have a significant impact on the environment. Included in an EIS would be the project's impact on wetlands, water quality, historic properties, wildlife, and public lands. While this report does not cover the environmental concerns in as much detail as an EIS would, preliminary research was done on several of these factors and is included below. The findings are also shown in Table 8.

Wetlands

In general terms, wetlands are lands where saturation with water is the dominant factor in determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. The single feature that most wetlands share is soil or substrata that is at least periodically saturated with or covered by water. Water creates severe physiological problems for all plants and animals except those that are adapted for life in it or in saturated soil.

Wetlands are crucial ecosystems in our environment. They help regulate and maintain the hydrology of our rivers, lakes, and streams by slowly storing and releasing floodwaters. They help maintain the quality of our water by storing nutrients, reducing sediment leads, and reducing erosion. They are also critical to fish and wildlife populations. Wetlands provide an important habitat for about one third of the plant and animal species that are federally listed as threatened or endangered.

In this study, the impacts to wetlands were determined using the National Wetlands Inventory Mapping, available from the U.S. Fish and Wildlife Service. The locations of wetlands throughout the planning area are shown in Figure 9.

Wetland impacts have been avoided or minimized to the greatest extent possible while preserving the integrity of the transportation plan.

Threatened and Endangered Species

A preliminary review of the Federally Listed Threatened and Endangered Species within the Planning Area was done to determine the effects that new corridors could have on the wildlife. These species were identified using mapping from the North Carolina Department of Environment, Health, and Natural Resources.

The Threatened and Endangered Species Act of 1973 allows the U.S. Fish and Wildlife Service to impose measures on the Department of Transportation to mitigate the environmental impacts of a road project on endangered plants and animals and critical

wildlife habitats. By locating rare species in the planning stage of road construction, we are able to avoid or minimize these impacts.

There is one State-listed threatened or endangered species identified in the Planning Area. It is listed below. Detailed field investigation is recommended prior to construction of any highway project in this area.

Endangered Species: Hexastylis Lewisii (Lewis' Heartleaf)

There were no other species identified in the Planning Area that are significantly rare or are of special concerns in North Carolina.

Historic Sites

The location of historic sites was investigated to determine the possible impacts of the various projects studied. The federal government has issued guidelines requiring all State Transportation Departments to make special efforts to preserve historic sites. In addition, the State of North Carolina has issued its own guidelines for the preservation of historic sites. These two pieces of legislation are described below:

National Historic Preservation Act – Section 106 of this act requires the Department of Transportation to identify historic properties listed in the National Register of Historic Places and properties eligible to be listed. The NCDOT must consider the impacts of its road projects on these properties and consult with the Federal Advisory Council on Historic Preservation.

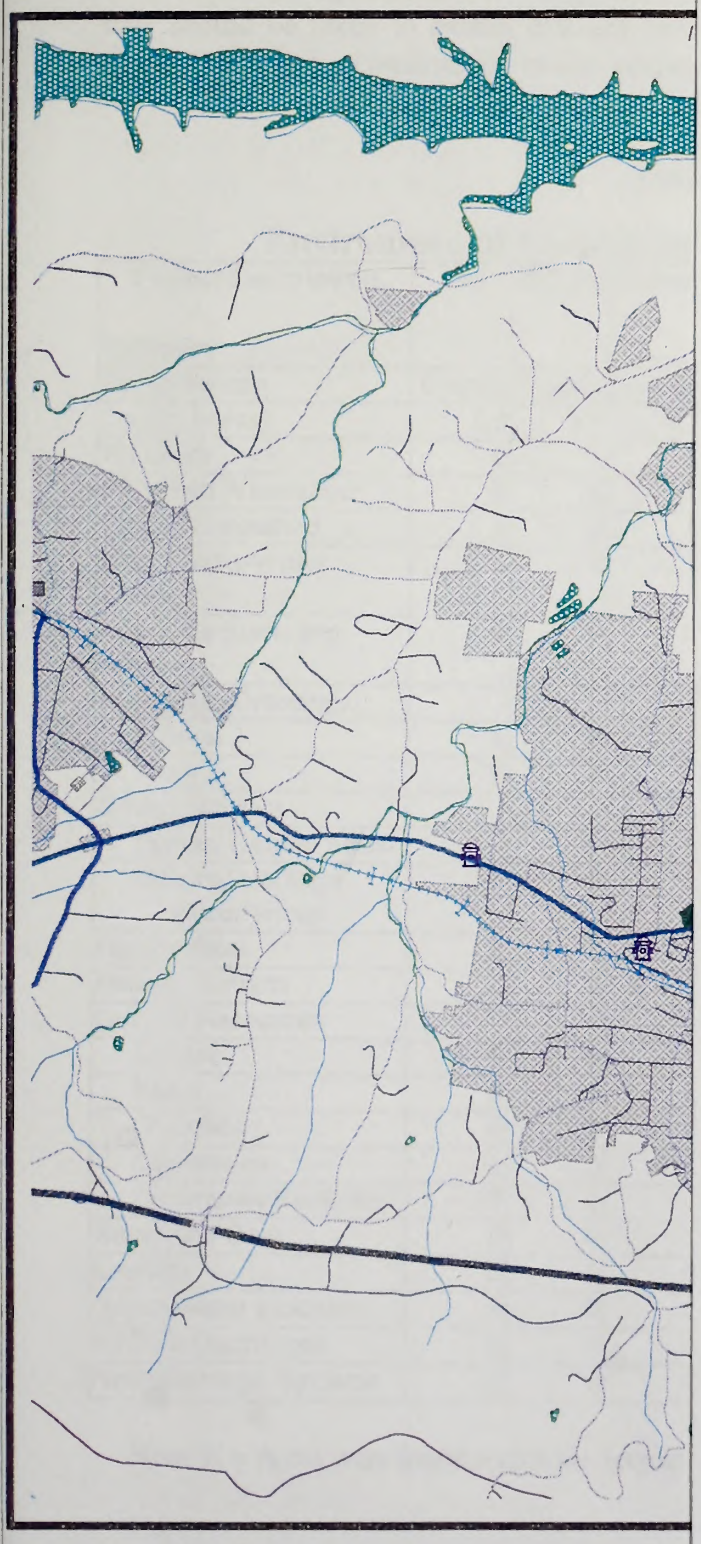
NC General Statute 121-12(a) – This statute requires the NCDOT to identify historic properties listed on the National Register, but not necessarily those properties eligible to be listed. NCDOT must consider impacts and consult with the North Carolina Historical Commission, but it is not bound by their recommendations.

There are currently two properties in the Planning Area listed on the National Register of Historic Places. The following is a list of Historic Places on the National Register in the Planning Area and their locations are shown in Figure 9.

Historic Places: Valdese Elementary School (Valdese) 10\25\84
Waldensian Presbyterian Church (Valdese) 10\25\84

Neither of these properties should be affected by the projects proposed on the thoroughfare plan. However, care should be taken to make certain all historic sites and natural settings are preserved. Therefore, a closer study should be done in regard to the local historic sites prior to the construction of any proposal.

Environmental Da Connelly Springs



LEGEND

- NPDES - Point Source Dischargers (24k)
- Surface Water Intakes (100k)
- Groundwater Incidents (100k)
- Air Quality Pollution Discharge Points (24k)
- Nat. Heritage Occurence Sites (Restricted-100k)
- Hist. Struct.-NR (Restricted-100k)
- Hist. Dist. -NR (Restricted-100k)
- Superfund Pts. (Haz. Subs. Dispos. Sites)
- Superfund Areas (Haz. Subs. Dispos. Sites)

Roads (DOT 24k - no attributes)

- Railroad
- Interstate
- US
- NC
- SR
- City
- Other
- DCM Wetlands
- NWI (arc-24k)
- NWI (poly-24k)
- Hydro - Rivers/Streams (100k)
- HQW Zones (100k)
- Municipal Boundaries (24k)
- State Parks (100k)
- River Basins - Minor (24k)

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Figure 8

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Environmental Data Map for Valdese, Rutherford College, and Connelly Springs

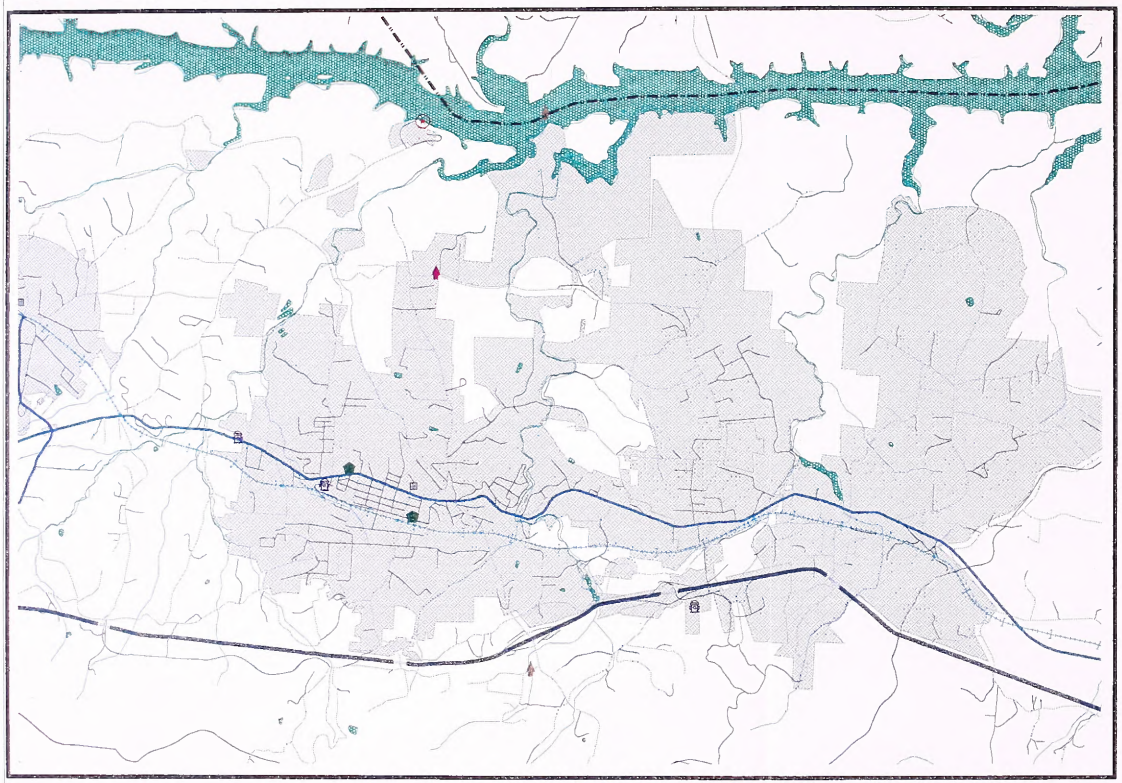

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Figure 8

Archaeology

There were no significant archaeological sites located in the Planning Area. However, care should be taken to ensure that any possible archaeological site be looked at more closely prior to the construction of any proposals.

Table 8

Environmental Considerations of Proposed Projects

Project Description / Category	I-40	US 70	Eldred	Malcolm	Meytre	Powell	St. Germain	Woodlawn
Cross Section	6-lanes	4-lanes	3-lanes	5-lanes	2-lanes	2-lanes	2-lanes	2-lanes
Length (miles)	5.3	1.1	1.2	2.7	1.0	1.2	0.8	0.8
Wetlands	0	0	0	0	0	0	0	0
Protected Watershed	X	X	X	X	X	X	X	X
Critical Watershed	0	0	0	X	X	0	0	0
High Quality Water Zones	0	0	0	0	0	0	0	0
Nurseries Spawning Areas	0	0	0	0	0	0	0	0
Hydrologic Crossings								
Normal	7	1	1	0	2	3	0	1
Trout	0	0	0	0	0	0	0	0
Critical Habitats								
Special Natural Areas	0	0	0	0	0	0	0	0
National Heritage Occurrences	0	0	0	0	0	0	0	0
Historic Sites	0	0	0	1	0	0	0	0
Historic Districts	0	0	0	0	0	0	0	0
Cultural Resources								
Schools	0	0	2	0	0	0	1	0
Parks	0	1	0	0	0	0	0	0
Churches	0	5	0	3	0	0	0	0
Cemeteries	0	0	0	0	0	0	0	0
Community Facilities	0	0	0	0	0	0	0	0
Superfund Sites	0	0	0	0	0	0	0	0
Landfills	0	0	0	0	0	0	0	0
Groundwater Incidents	1	0	0	0	0	0	1	0
NPDES Discharges	1	0	0	0	0	0	0	0
Non-discharge Systems	0	0	0	0	0	0	0	0

Note: X = Areas were found within the project limits to have these environmental concerns.

CHAPTER 7

TRAFFIC MODEL DEVELOPMENT

In order to develop an efficient thoroughfare plan for Valdese, Rutherford College, and Connelly Springs, it was necessary to develop and calibrate a traffic model of the municipalities. To develop a traffic model, the following things are necessary: define the study area, collect data, and project socioeconomic data to the design year. Once the socioeconomic data has been projected, the model may be used to evaluate various street system problems and alternate solutions to the problems. Appendix D has a list of the computer files used to develop this model.

The Study Area

The study area consists of the Towns of Valdese, Rutherford College, Connelly Springs, and some additional outlying areas (Figure 6). This area was divided into 70 zones for data collection and aggregation and had 13 external stations. The data for the dwelling units and employment for 1996 was collected from census data and windshield surveys. The projections of socioeconomic data to the future year were done based on past trends from previous census data and projections by the Office of State Planning and local staff.

The Base Year Network

The purpose of the traffic model is to replicate the conditions on the Towns' street systems. Therefore it is necessary to represent the existing street system in the model. There is a balance between having too many streets on the model to allow it to be calibrated and not having enough streets to realistically duplicate existing conditions. All the major arterials and some of the major land access or collector streets are represented.

Street capacity is an important component of the model. The volume to capacity ratio (v/c) gives us our best indication of present and future traffic congestion.

Speed and distance are the major factors that define the minimum time paths from zone to zone. The model uses the minimum time paths as the basis for assigning traffic to streets. Generally in the Valdese-Rutherford College-Connelly Springs model, the speeds assigned to links of the street system are at, or slightly below, the posted speed limit. Figure 10 shows the Tranplan Network overlaid on the actual street system. An all-or-nothing loading method was used.

Data Requirements

In order to produce an adequate traffic model of the study area, two additional types of data are required. First, traffic counts on routes used in the model provide a basis for calibrating the model. These traffic counts show a snapshot of traffic conditions in the study area. Figure 11 shows these locations. Second, socioeconomic data (housing counts and employment estimates) are necessary in order to generate traffic for the model. The housing and socioeconomic data for

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Traffic Counts

The model must be calibrated against existing conditions in the study area. In order to calibrate the model traffic counts must be taken at various locations around the study area. The counts for much of the study were collected during 1995. Traffic count locations are found in Figure 11.

Also, volumes on all routes crossing the planning area boundary were counted. These counts show how much traffic is entering and exiting the study area.

Socioeconomic Data

The required data consists of housing counts and employment estimates. The housing information is used in the model as the producer of trips, and employment is used as the attractor of trips.

An excellent indicator of the average number of trips made from a household is income. Since there is no adequate method for determining household income, the type and quality of housing was used as an indicator of household income. The Statewide Planning staff conducted a windshield survey in February 1996 and April 1998 to collect housing and employment data. The housing inventory was divided into five categories: excellent, above average, average, below average, and poor. Each of these categories was assigned a slightly different trip generation rate. Figure 12 shows the housing counts for each traffic zone and Table 9 shows the generation rates used.

Table 9
1996 and 2025 Housing Trip Generation Rates

Housing Classification	1996 and 2025 Generation Rate
Excellent	12.0
Above Average	10.5
Average	8.5
Below Average	7.0
Poor	5.5

The employment data that was collected was broken out by Standard Industrial Code classification and grouped into six categories: industry, special retail, retail, office, services and special. The Statewide Planning staff gathered the number of employees of each business. This data was used with a regression equation developed from an origin and destination survey of a similar size city to produce an attraction factor for each zone. Figure 13 show total employment by traffic analysis zone.

TRANPLAN NETWORK

LEGEND

NETWORK ROADS ——

N

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Figure 9

VALDESE–RUTHERFORD COLLEGE–CONNELLY SPRINGS
BURKE COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH

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SCALE

0 1000 2000 3000 4000
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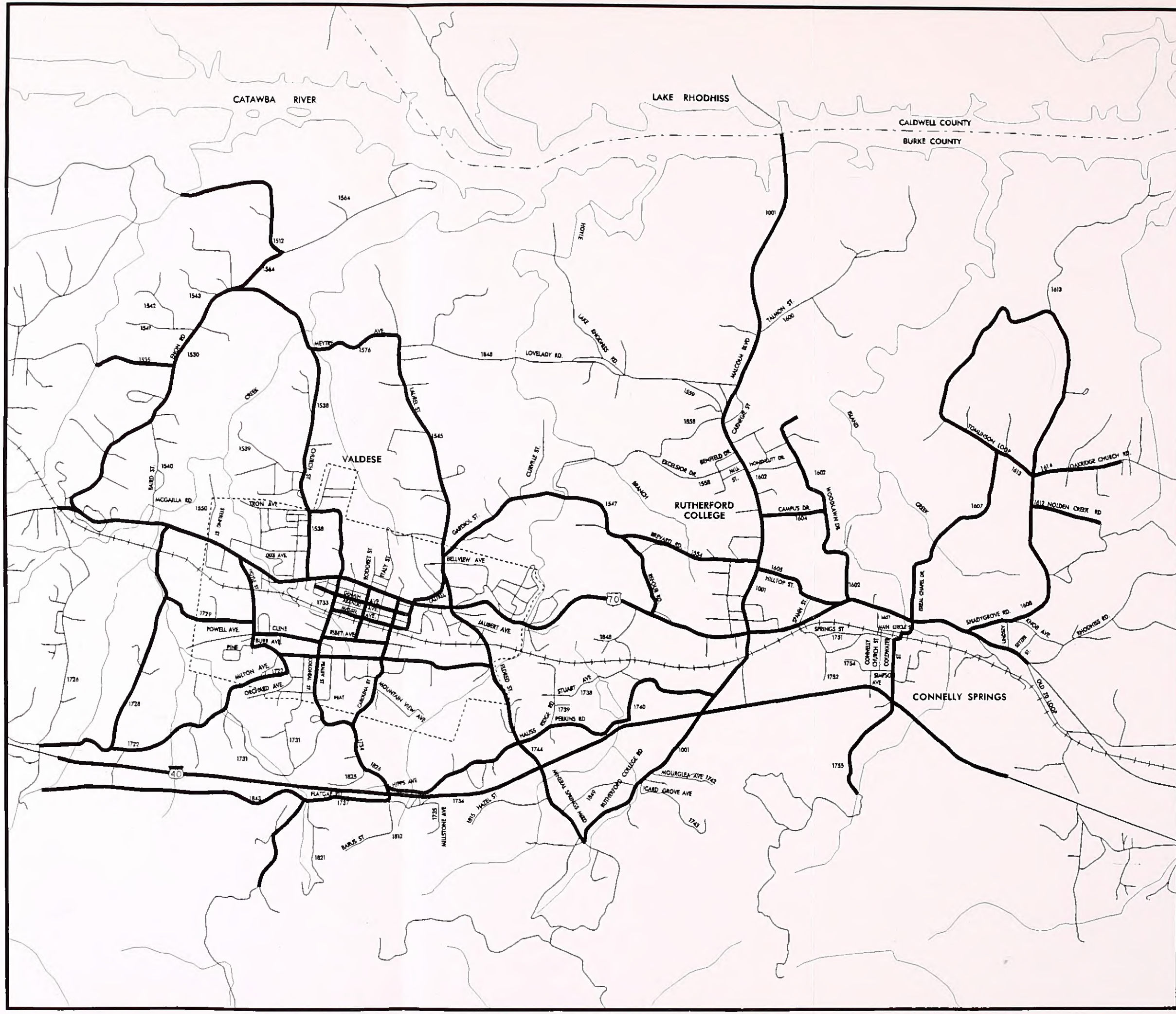
TRANPLAN NETWORK



LEGEND

NETWORK ROADS ———

Figure 9

VALDESE–RUTHERFORD COLLEGE–CONNELLY SPRINGS
BURKE COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH

IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

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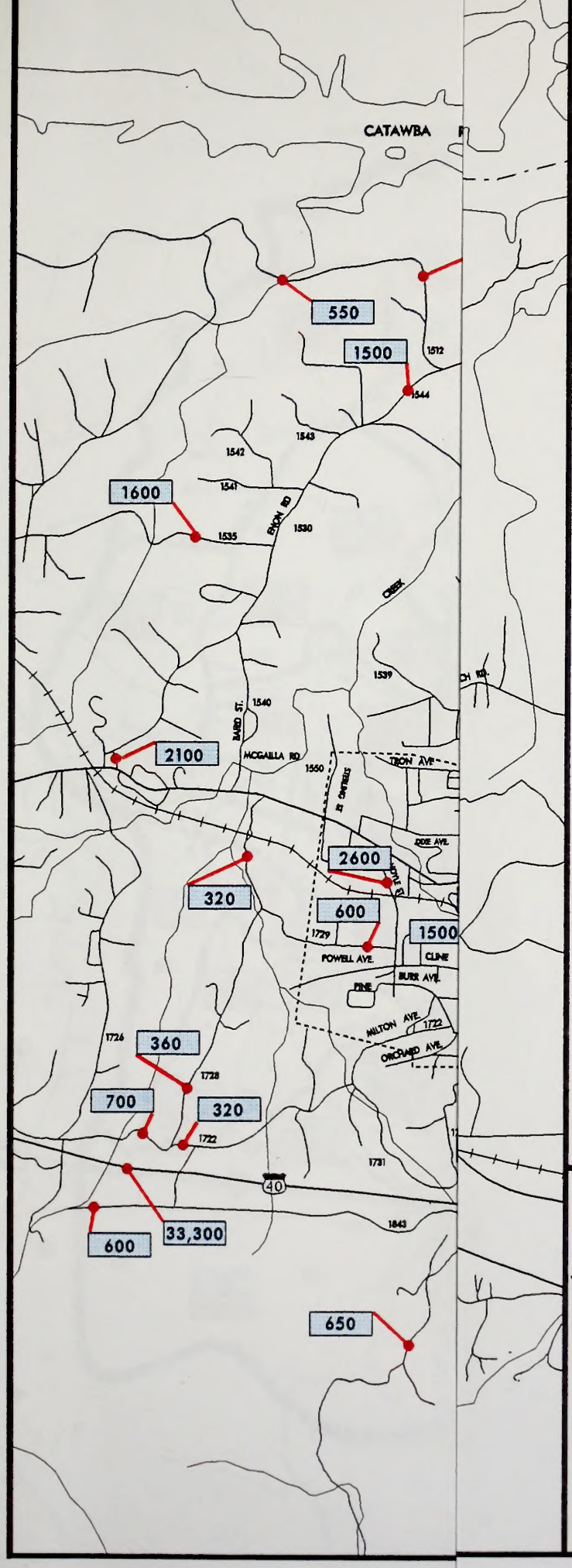
Feet



TRAFFIC COUNT LOCATIONS

LEGEND

BASE YEAR ADT 00000

N

S

Figure 10

VALDESE–RUTHERFORD COLLEGE–CONNELLY SPRINGS
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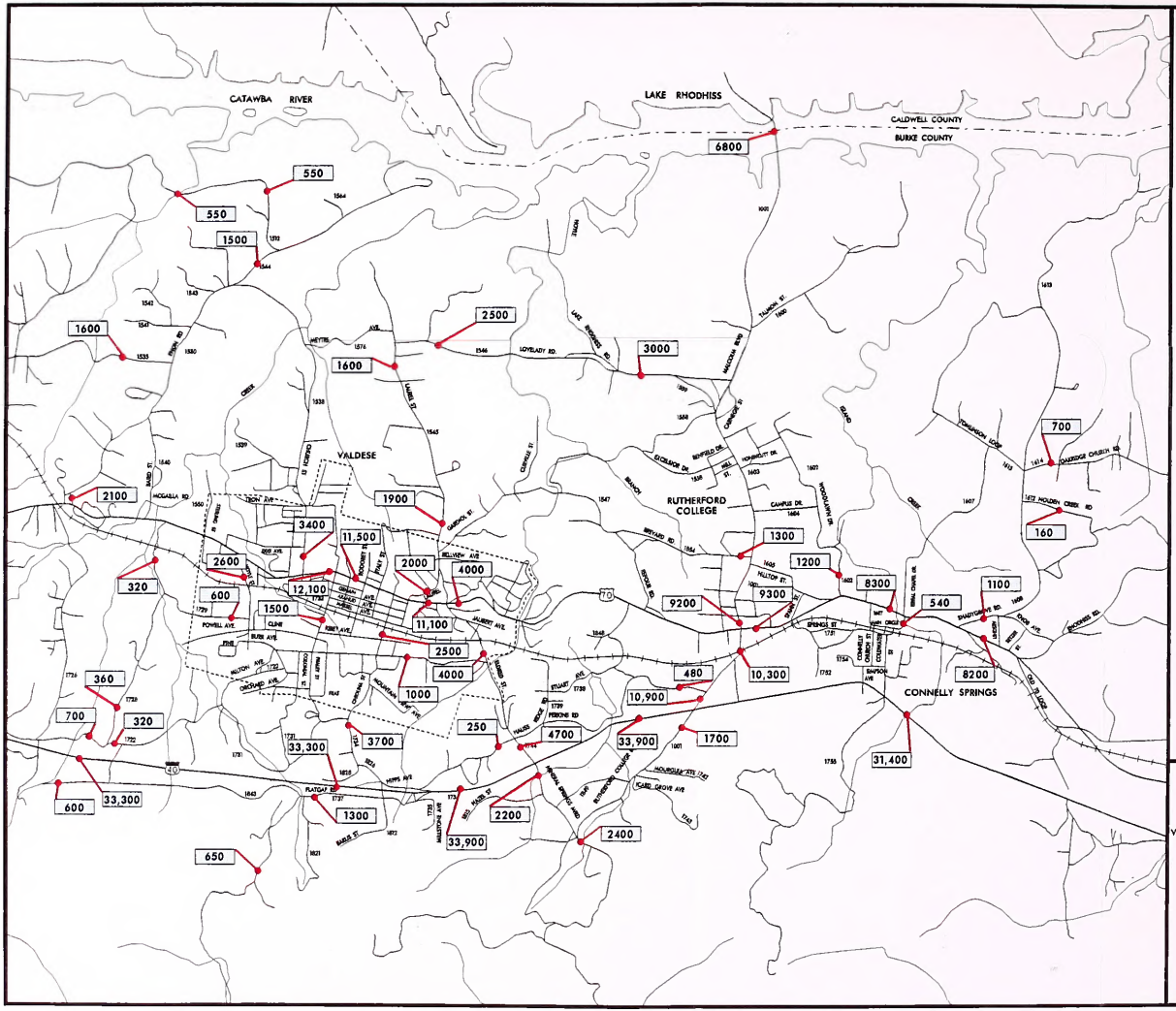

TRAFFIC COUNT LOCATIONS

LEGEND

BASE YEAR ADT 00000

Figure 10

VALDESE-RUTHERFORD COLLEGE-CONNELLY SPRINGS
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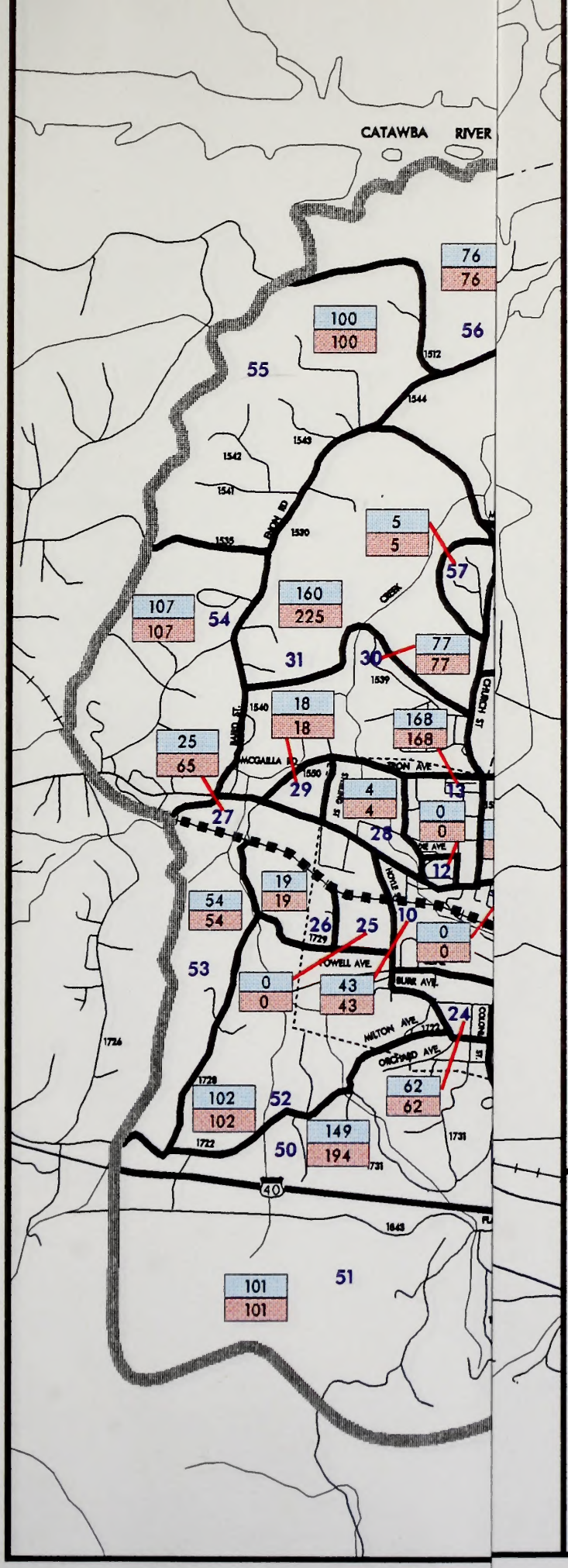

HOUSING DATA BY ZONE

LEGEND

PLANNING BOUNDARY

ZONE LINE

SCREEN LINE

1996 HOUSING 00000

2025 HOUSING 00000

ZONE NUMBER 00000

N

S

Figure 11

VALDESE-RUTHERFORD COLLEGE-CONNELLY SPRINGS

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SCALE

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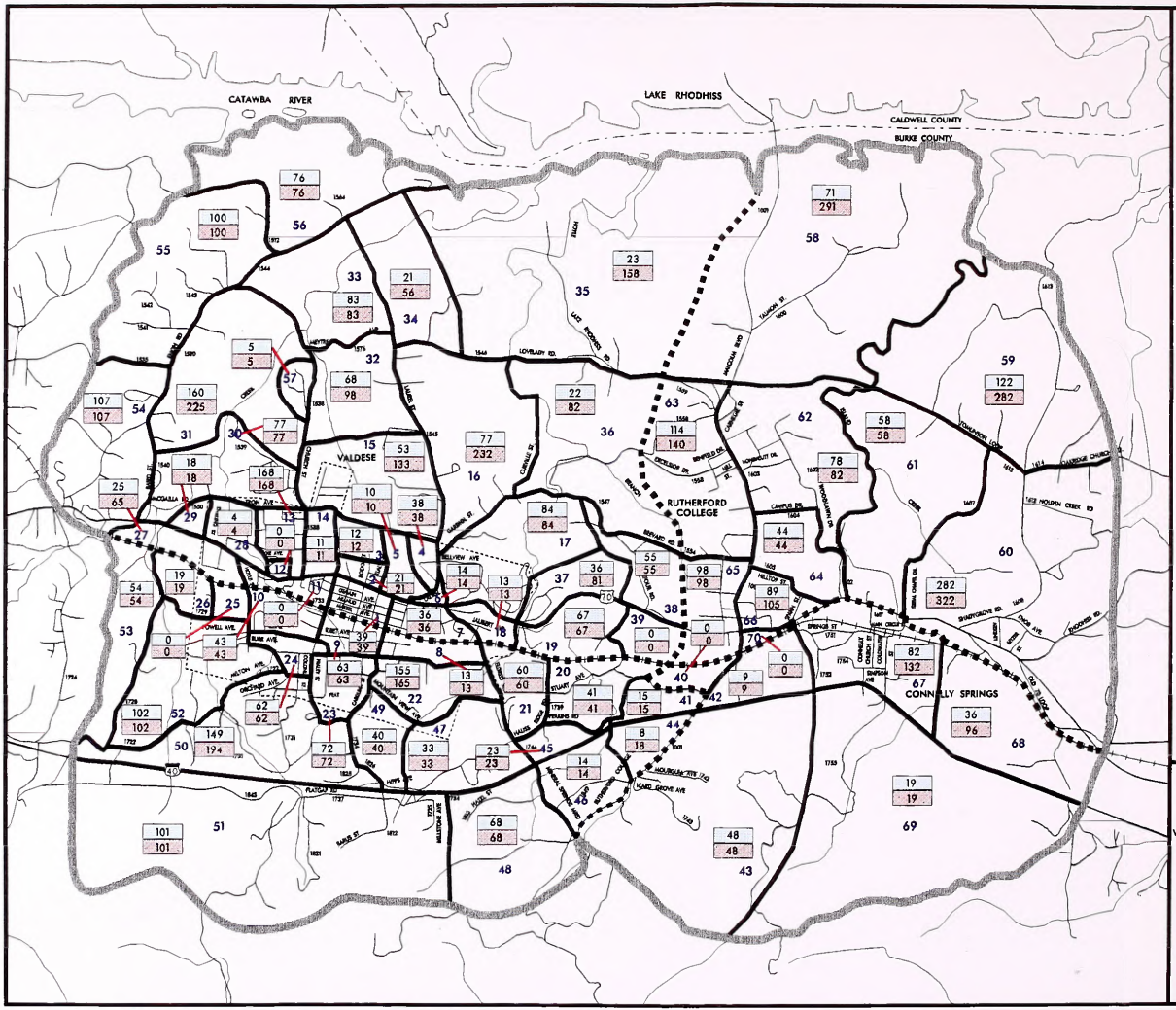

HOUSING DATA BY ZONE

LEGEND

PLANNING BOUNDARY	
ZONE LINE	
SCREEN LINE	
1996 HOUSING	00000
2025 HOUSING	00000
ZONE NUMBER	00000

Figure 11

VALDESE-RUTHERFORD COLLEGE-CONNELLY SPRINGS
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SCALE

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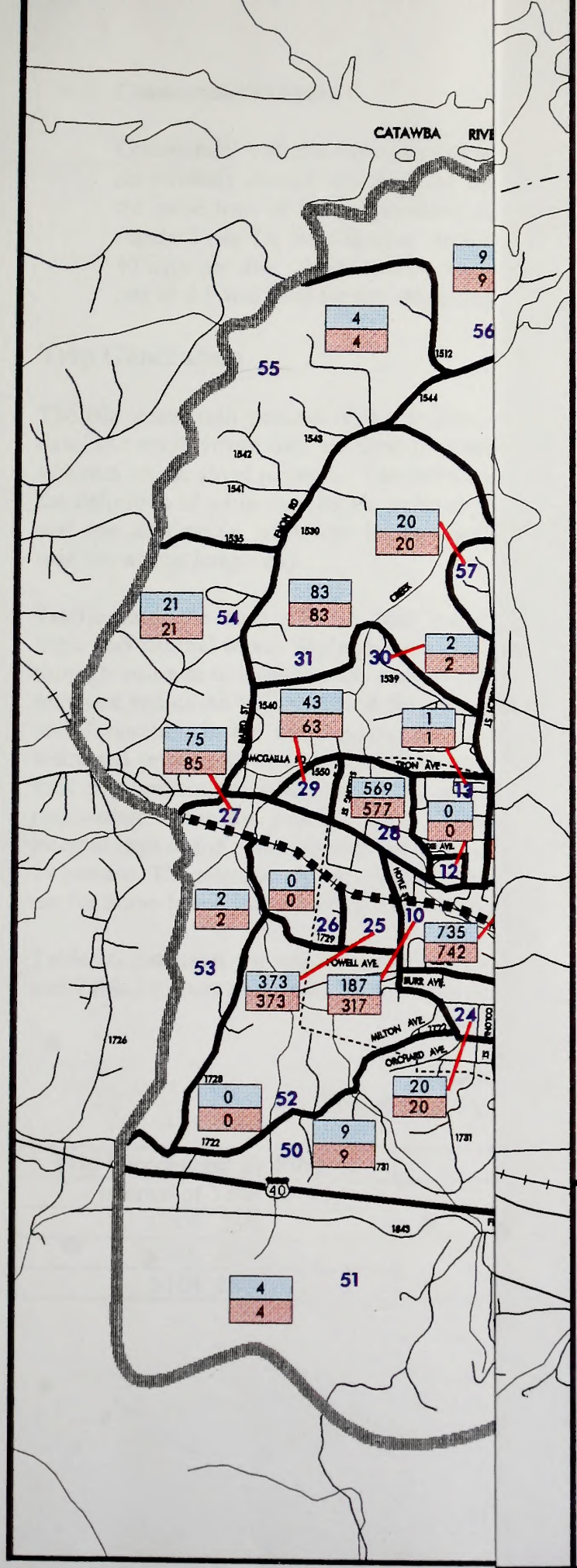
feet



EMPLOYMENT DATA BY ZONE

LEGEND

PLANNING BOUNDARY	
ZONE BOUNDARY	
SCREEN LINE	
1996 EMPLOYMENT	00000
2025 EMPLOYMENT	00000
ZONE NUMBER	00000

N

S

Figure 12

VALDESE–RUTHERFORD COLLEGE–CONNELLY SPRINGS
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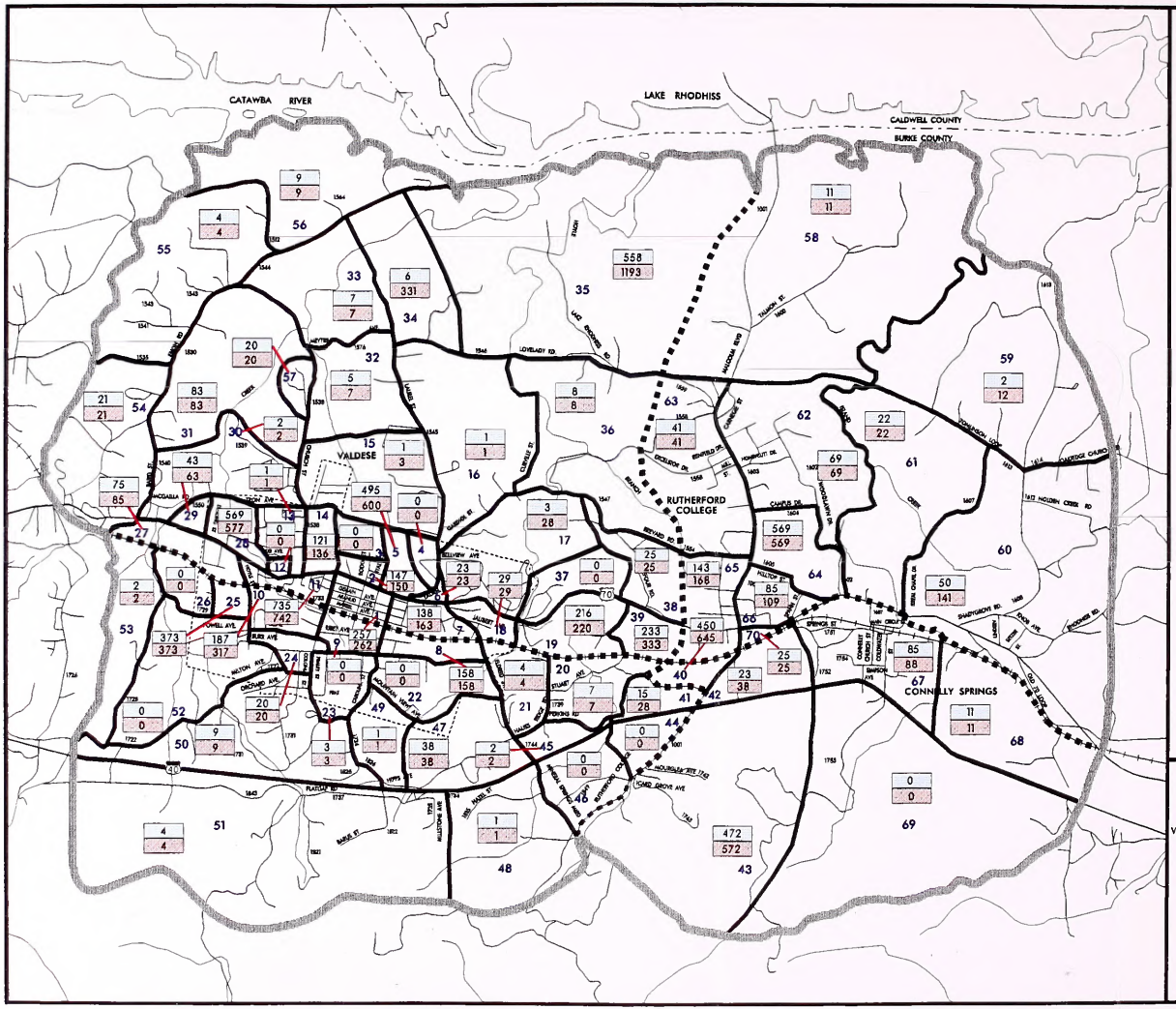

EMPLOYMENT DATA BY ZONE

LEGEND

- PLANNING BOUNDARY
- ZONE BOUNDARY
- SCREEN LINE
- 1996 EMPLOYMENT — 00000
- 2025 EMPLOYMENT — 00000
- ZONE NUMBER — 00000

Figure 12

VALDESE-RUTHERFORD COLLEGE-CONNELLY SPRINGS
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SCALE

0 1000 2000 3000 4000
feet

Commercial Vehicles

Commercial vehicles have somewhat different trip generation characteristics than do privately owned vehicles. An inventory of commercial vehicles was done at the same time as the employment and housing inventory for the study area. A standard rate for taxis is used throughout the State. Taxis produce an average of 40 trips per day. A generation rate of 5.7 was used for commercial trucks and a rate of 4.9 was used for the remaining commercial autos.

Trip Generation

The trip generation process is the process in which external station volumes, housing data, and employment data are used to generate traffic volumes that duplicate the traffic volumes on the street network. The technical definition of a trip is slightly different than the definition of a trip used by the general public. Technically, a trip only has one origin and one destination while the layman will often group, or chain, several short trips together as one longer trip.

Traffic inside the study area has three major components: through trips, external-internal trips, and internal trips. Through trips are produced outside the planning area and pass through en-route to a destination outside the planning area. External-internal trips have only one end of the trip outside of the planning area. Internal trips have both their origin and destination inside the planning area. Since the total trips generated by the rates discussed previously contained both internal-to-external and internal-internal trips, the total trip productions were reduced so as not to double count the internal-external trips originating within the planning area. These trips are counted as part of the external-internal trips at the planning area boundary. The total internal trip table was reduced by 14 percent. The internal trips are further subdivided into trip purposes. The trip purposes are for home-based work (HBW), other-home based (OHB), and non-home based (NHB).

Table 10 illustrates the variables that are considered when determining trip percentages and Table 11 gives a summary of each trip purpose.

Table 10
Travel Model Input Variables

Trip Percentages by Purpose	Year	Persons/DU
Internal of Total 86%		
HBW 25%	1996	2.56
OHB 50%		
NHB 25%	2025	2.31

Table 11
Travel Data Summary

Type	1996	2025
Average Daily Trips per DU	8.35	8.66
Internal Trips	**27,354**	**38,141**
Home Based Work (HBW)	6,839	9,535
Other Home Based (OHB)	13,677	19,071
Non-Home Based (NHB)	6,839	9,535
NHB Secondary	8,178	17,873
External-internal	**25,444**	**51,551**
Through Trips	**38,358**	**76,872**
Total Daily Trips	**91,156**	**172,564**

Secondary NHB Trip Development

The remaining component of internal trips are "secondary" trips; the NHB trips produced by vehicles garaged outside the planning area but having both trip ends within the planning area.

Secondary NHB Trips = [(Total Ext/Int Trips) – (Ext/Int Trips Garaged Inside Planning Area)] X 0.4*

1996 Secondary NHB Trips = (25,444 – 4,999) X 0.4 = 8,178
2025 Secondary NHB Trips = (51,551 – 6,868) X 0.4 = 17,873

* Assumed NHB trip making rate per each one-way external-internal trip by vehicles garaged outside the planning area.

The breakdown of internal trips by purpose and total of non-home based (NHB) trips generated externally are shown in Table 11.

Through Trips

The Through Trip Table for this study was developed based on Technical Report 3: Synthesized Through Trip Table for Small Urban Areas by Dr. David G. Modlin, Jr..

Once these volumes were developed, the Fratar balancing method was then used to balance the trip interchanges so that the total number of through trips at each external station is consistent with the total number of through trips at every other station.

External-Internal

The external-internal trip volume was determined by subtracting the through trip volume at each station from the total traffic volume at that station. See Table 11 for external-internal and through trip values.

Internal Data Summary (IDS)

IDS is the process that takes the external-internal traffic volumes, housing data, employment data, generation rates, and regression equations and generates the trip productions and trip attractions required by the gravity model. Housing units were stratified to account for differing trip generation rates for each classification. The individual trip generation rates give an average trip generation rate for the study area of 8.35 trips per dwelling unit (du) for 1996.

Trip attractions were produced using regression equations. The regression equations consider trip attractions to be related to the employment characteristics of the traffic zones. The trips are segregated into four trip purposes because different trip lengths are associated with each trip purpose: home-based work (HBW), non-home based (NHB), home-based other (HBO), and external-internal. HBW trip attraction factors are based on total employment. OHB and NHB trip attraction factors are based on employment groupings in each zone. The output of the IDS program is trip productions and trip attractions for each zone divided into the four trip purposes. The regression equations are:

$$\text{HBW } Y = 1.0X_1 + 1.0X_2 + 1.0X_3 + 1.0X_4 + 1.0X_5 + 1.0X_8$$
$$\text{OHB } Y = 0.1X_1 + 2.0X_2 + 8.3X_3 + 2.6X_4 + 2.5X_5 + 3.1X_8 + 0.5X_{12}$$
$$\text{NHB } Y = 0.2X_1 + 2.0X_2 + 8.3X_3 + 2.6X_4 + 2.5X_5 + 3.1X_8 + 0.2X_{12}$$
$$\text{EXT } Y = 0.5X_1 + 2.0X_2 + 8.3X_3 + 2.6X_4 + 2.5X_5 + 3.1X_8 + 2.1X_{12}$$

Where:
- Y = Attraction factor for each zone
- X_1 = Industry (SIC codes 1-49)
- X_2 = Retail (SIC codes 55,58)
- X_3 = Special Retail (SIC codes 50-54, 56, 57, 59)
- X_4 = Office (SIC codes 60-67, 91-97)
- X_5 = Service (SIC codes 70-76, 78-89, 99)
- X_8 = Special (Valdese General Hospital)
- X_{12} = Dwelling Units

Internal Trip Distribution

Once the number of trips per traffic zones is determined, the trips must still be distributed to other traffic zones. The preferred method of distributing internal and external-internal trips, called the *Gravity Model*, states that the number of trips between Zone A and Zone B is multiplied by a travel time factor. The gravity model takes the form:

$$T_{ij} = \frac{P_i \times A_j \times F_{ij}}{\text{Sum } X = 1,n \text{ of } A_x F_{t,x}}$$

- T_{ij} = The number of trips produced in zone i and attracted to zone j
- P_i = The number of trips produced in zone i
- A_j = The number of trips attracted to zone j
- F_{ij} = The travel time factor
- n = The total number of zones
- i = The origin zone number
- j = The destination zone number
- X = Any zone number.

The travel time factor or friction factor (F) is critical to the gravity model distribution and must be derived empirically. The friction factor is dependent on the distance between the traffic zones and the time necessary to travel these distances. This factor is also dependent on the trip purpose. In order to derive this factor a gravity model calibration program is run with an initial friction factor and trip length frequency curve for each trip purpose. Table 12 shows the actual values used for the friction factors and trip length frequency curve.

Table 12
Friction Factors & Travel Curve Data

	Friction Factors				Travel Curves % Trips Distributed			
Time Interval	HBW	OHB	NHB	Ext-Int	HBW	OHB	NHB	Ext-Int
1	2036	5207	3384	2237	1.59	5.91	15.91	0.17
2	7329	9899	7031	38899	11.78	16.24	30.04	18.73
3	4667	5404	4390	3500	33.36	33.94	41.25	24.37
4	1321	1627	500	1316	31.62	27.83	8.78	43.17
5	418	519	200	100	15.48	12.51	3.95	11.52
6	40	40	40	5	2.44	1.31	0.07	2.03
7	20	20	0	0	3.74	2.27	0.00	0.00

Model Calibration

The purpose of a traffic model is to predict the traffic on a street system at some future point in time. Therefore, the model must duplicate the existing traffic pattern. The actual calibration of the model is an iterative process in which incremental changes are made either in the trip generation, trip distribution, or the street network. The purpose of each change is to allow the model to more accurately reflect the real world conditions upon which it is based. Only when the model can adequately reflect the existing traffic pattern should it be used to predict traffic in the future. The model was calibrated with 1995 Average Daily Traffic (ADT) counts on all routes on the traffic model.

Accuracy Checks

There are three principal checks made on the model. The first is to follow trips through all the steps involved in the model. The purpose of this check is to insure that no trips have been accidentally added to or subtracted from the model, and that no trips have been counted twice.

The second check is to compare the model-generated trips on the screenlines with the ground counts taken at the screenlines. A model is considered to accurately reflect the overall patterns if the trips it generates are from 95% to 105% of the ground counts on the

screenlines. Table 13 compares the ground counts with the model-generated traffic volumes on the screenlines. See Figure 6 for screenline locations.

The final check for the model is to match the traffic volumes on the links in the model with the ADT at the same locations. The 'link counts' can be used to find particular places in the network where there are problems. Comparing the link counts with the ground counts for those links did not reveal any significant problems with the model.

Table 13
Actual vs. Model Screenline Total

Screenline	*Groundcount*	*Model Volume*	*Percent*
A North/South	39,320	41,285	0.95
B East/West	21,220	20,868	1.02

Data Projections to the Design Year

In order to make use of the model, the base year data must be modified to reflect assumed conditions in the design year. These projections and the previously developed regression equations were used to produce trip productions and attractions in the same manner as the base year. Appendix D shows the employment and housing projections by traffic analysis zone.

Dwelling Unit Projections

Future dwelling units were determined by extending person per dwelling unit trends for Burke County linearly to the design year. The number of dwelling units are projected to increase by 33%. The Statewide Planning Branch projected residential growth and with the help of the Town Planners distributed these houses throughout the planning area. Figure 12 compares the total dwelling units per zone in 1996 with the projected total dwelling units per zone in 2025. The individual trip generation rates give an average trip generation rate for the study area of 8.66 trips per dwelling unit (du) for 2025.

Employment Projections

The Statewide Planning Branch and the Town Planners projected and distributed the 2025 employment to the zones where they anticipated employment growth. Those projections were added to the 1996 data. Employment projections throughout the planning area indicated steady growth. Figure 13 compares the total employment per zone data in 1996 with the projected total employment per zone data in 2025.

External and Through Trips

For the design year, external and through trips were projected from the base year using a linear projection of the past growth rate at each external station. Cordon Station data can be found in Table 14.

Table 14
Cordon Station Travel

Computer Station	Base Year - 1996			Future Year 2025		
	Total ADT	Thru Trip End	Ext-Int Trips	Total ADT	Thru Trip End	Ext-Int Trips
71	31,400	30,776	624	66,000	62,980	3,020
72	2,400	374	2,026	4,300	664	3,636
73	650	60	590	1,400	123	1,277
74	600	54	546	1,300	111	1,189
75	33,300	31,810	1,490	70,000	65,096	4.904
76	700	64	636	1,300	114	1,186
77	15,100	7,938	7,162	27,000	14,097	12,903
78	1,600	212	1,388	2.900	376	2,524
79	550	50	500	500	89	411
80	6,800	2,028	4,772	13,400	4,150	9,250
81	700	76	624	1,400	135	1,265
82	160	14	146	300	25	275
83	8,200	3,260	4,940	15,000	5,789	9,211

APPENDIX A

Thoroughfare Planning Principles

There are many advantages to thoroughfare planning, but the primary mission is to assure that the road system will be progressively developed to serve future travel desires. Thus, the main consideration in thoroughfare planning is to make provisions for street and highway improvements so that, when the need arises, feasible opportunities to make improvements exist.

Benefits of Thoroughfare Planning

Two of the major benefits derived from thoroughfare planning are as follows: 1) Each road or highway can be designed to perform a specific function. This permits savings in right-of-way, construction, and maintenance costs. It also protects residential neighborhoods and encourages stability in travel and land use patterns. 2) Local officials are informed of future improvements and can incorporate them into planning and policy decisions. This will permit developers to design subdivisions in a non-conflicting manner, direct school and park officials to better locate their facilities, and minimize the damage to property values and community appearance that is associated with roadway improvements.

Objectives of Thoroughfare Planning

Typically, the urban street system occupies 25 to 30 percent of the total developed land in an urban area. Since the system is permanent and expensive to build and maintain, much care and foresight are needed in its development. Thoroughfare planning is the process public officials use to assure the development of the most appropriate street system that will meet existing and future travel desires within the urban area.

The primary aim of a thoroughfare plan is to guide the development of the urban street system in a manner consistent with the changing traffic patterns. A thoroughfare plan will enable street improvements to be made as traffic demands increase, and it helps eliminate unnecessary improvements, so needless expense can be averted. By developing the urban street system to keep pace with increasing traffic demands, a maximum utilization of the system can be attained, requiring a minimum amount of land for street purposes. In addition to providing for traffic needs, the thoroughfare plan should embody those details of good urban planning necessary to present a pleasing and efficient urban community. The location of present and future population along with commercial and industrial development affects major street and highway locations. Conversely, the location of major streets and highways within the urban area will influence the urban development pattern.

Other objectives of a thoroughfare plan include:

- Providing for the orderly development of an adequate major street system as land development occurs;
- Reducing travel and transportation costs;
- Reducing the cost of major street improvements to the public through the coordination of the street system with private action;
- Enabling private interest to plan their actions, improvements, and development with full knowledge of public intent;
- Minimizing disruption and displacement of people and businesses through long range advance planning for major street improvements;
- Reducing environmental impacts, such as air pollution, resulting from transportation, and
- Increasing travel safety.

Thoroughfare planning objectives are achieved through improving both the operational efficiency of thoroughfares, and the system efficiency through system coordination and layout.

Operational Efficiency

A roadway's operational efficiency is improved by increasing the capability of the roadway to carry more vehicular traffic and people. In terms of vehicular traffic, a roadway's capacity is defined by the maximum number of vehicles that can pass a given point on a roadway during a given time period under prevailing roadway and traffic conditions. Capacity is affected by the physical features of the roadway, nature of traffic, and weather.

Physical ways to improve vehicular capacity include:

- **Roadway widening** - widening of a road from two to four lanes more than doubles the capacity of the road by providing additional maneuverability for traffic.
- **Intersection improvements** - Increasing the turning radii, adding exclusive turn lanes, and channelizing movements can improve the capacity of an existing intersection.
- **Improving vertical and horizontal alignment** - Alignment improvements reduce the congestion caused by slow moving vehicles.

- **Eliminating roadside obstacles** - Improving lateral clearance reduces side friction and improves a driver's field of sight.

Operational ways to improve roadway capacity include:

- **Control of Access** - A roadway with complete access control can often carry as much as three times the traffic handled by a non-controlled access road with identical width and number of lanes.

- **Parking removal** - increases capacity by providing additional roadway width for traffic flow and reducing friction to flow caused by parking and unparking vehicles.

- **One-way operation** - The capacity of a road can sometimes be increased 20-50%, depending on turning movements and overall roadway width, by initiating one-way traffic operations. One-way streets can also improve traffic flow by decreasing potential traffic conflicts and simplifying traffic signal coordination.

- **Reversible lane** - reversible traffic lanes may be used to increase roadway capacity in situations where heavy directional flows occur during peak periods.

- **Signal phasing and coordination** - Uncoordinated signals and poor signal phasing restrict traffic flow by creating excessive stop-and-go operation.

Altering travel demand is a third way to improve the efficiency of existing roads. Travel demand can be reduced or altered in the following ways:

- **Carpools** - Encouraging the formation of carpools and vanpools for journeys to work and other trip purposes reduces the number of vehicles on the roadway and raises the people carrying capability of the street system.

- **Alternate mode** - Encouraging the use of transit and bicycle reduces vehicular congestion.

- **Work hours** - Programs by industries, businesses, and institutions to stagger work hours or establish variable work hours for employees spreads peak travel over a longer time period and thus reduces peak hour demand.

- **Land use** - Planning land use can control development or development in a more travel efficient manner.

System Efficiency

Another means for altering travel demand is the development of a more efficient system of roads that will better serve travel desires. A more efficient transportation system can reduce travel distances, time, and user costs. Improvements in system efficiency can be achieved through the concept of functional classification of streets and development of a coordinated major street system.

Thoroughfare Classification Systems

Streets perform two primary functions, traffic service and land service, which when combined, are basically incompatible. The conflict is not serious if both traffic and land service demands are low. However, when traffic volumes are high, conflicts created by uncontrolled and intensely developed abutting property lead to intolerable traffic flow friction and congestion.

The underlying concept of the thoroughfare plan is that it provides a functional system of streets that permits travel from origins to destinations with directness, ease and safety. Different streets in this system are designed and called on to perform specific functions, thus minimizing the traffic and land service conflict.

Urban Classification

In the urban thoroughfare plan, elements are classified according to the function they serve. Roadways may be classified as major thoroughfares, minor thoroughfares, or local access streets.

Local Access Streets provide access to abutting property. They are not intended to carry heavy volumes of traffic and should be located such that only traffic with origins and destinations of the streets could be served. Local streets may be further classified as residential, commercial, and/or industrial depending upon the type of land use that they serve.

Minor Thoroughfares are more important streets on the town system. They collect traffic from the local access streets and carry it to the major thoroughfares. They may in some instances supplement the major thoroughfare system by facilitating minor through traffic movements. A third function that may be performed is that of providing access to abutting property. They should be designed to serve limited areas so that their development as major thoroughfares will be prevented.

Major Thoroughfares are the primary traffic arteries of the town. Their function is to move intra-town and inter-town traffic. The streets that comprise the major thoroughfare system may also serve abutting property; however, their principle function is to carry traffic. They should not be bordered by uncontrolled strip development because such development significantly lowers the capacity of the thoroughfare to carry traffic and each driveway is a danger and impediment to traffic

flow. Major thoroughfares may range from a two-lane street carrying minor traffic volumes to major expressways with four or more traffic lanes. Parking normally should not be permitted on major thoroughfares.

Idealized Major Thoroughfare System

A coordinated system of major thoroughfares forms the basic framework of the urban street system. A major thoroughfare system that is most adaptable to desire lines of travel within an urban area is the radial-loop system. It permits movement between various areas of the city within maximum directness. This system consists of several functional elements: radial streets, cross-town streets, loop system streets, and bypasses (Figure A-1).

Radial streets provide for traffic movement between points located on the outskirts of the city and the central area. This is a major traffic movement in most cities, and the economic strength of the central business district depends upon the adequacy of this type of thoroughfare.

If all radial streets crossed in the central area, an intolerable congestion problem would result. To avoid this problem, it is very important to have a system of cross-town streets that form a loop around the central business district. This system allows traffic moving from origins on one side of the central area to destinations on the other side to follow the area's border. It also allows central area traffic to circle and then enter the area near a given destination. The effect of a good cross-town system is to free the central area of cross-town traffic, thus permitting the central area to function more adequately in its role as a business or pedestrian shopping area.

Loop system streets move traffic between suburban areas of the town. Although a loop may completely encircle the town, a typical trip may be from an origin near a radial thoroughfare to a destination near another radial thoroughfare. Loop streets do not necessarily carry heavy volumes of traffic, but they function to help relieve the central area. There may be one or more loops, depending on the size of the urban area. They are generally spaced one-half mile to one mile apart, depending on the intensity of land use.

A **bypass** is designed to carry traffic through or around the urban area, thus providing relief to the town street system by removing traffic that has no desire to be in the town. Bypasses are usually designed to through-highway standards, with control of access. Occasionally, a bypass with low traffic volume can be designed to function as a portion of an urban loop. The general effect of bypasses is to expedite the movement of through traffic and to improve traffic conditions within the town. By freeing the local streets for use by shopping and home-to-work traffic, bypasses tend to increase the economic vitality of the local area.

Application of Thoroughfare Planning Principles

The concepts presented in the discussion of operational efficiency, system efficiency, functional classification, and idealized major thoroughfare system are the conceptual tools available to the transportation planner in developing a thoroughfare plan. In actual practice thoroughfare planning is done for established urban areas and is constrained by existing land use and street patterns, existing public attitudes and goals, and current expectations of future land use. Compromises must be made because of these and the many other factors that affect major street locations.

Through the thoroughfare planning process it is necessary from a practical viewpoint that certain basic principles be followed as closely as possible. These principles are listed below.

1. The plan should be derived from a thorough knowledge of today's travel - its component parts, and the factors that contribute to it, limit it, and modify it.

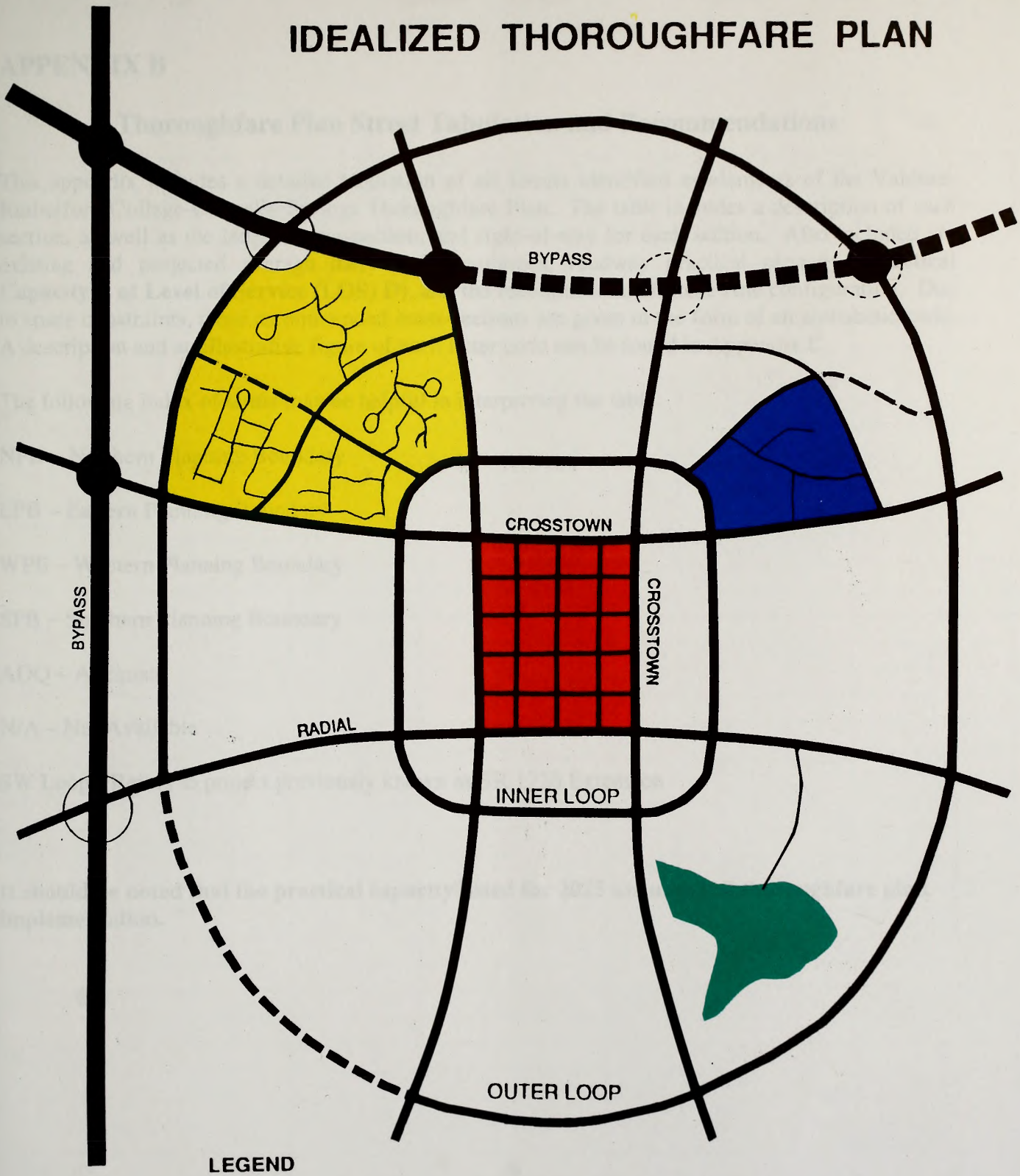
2. Traffic demands must be sufficient to warrant the designation and development of each major street. The plan should be designed to accommodate a large portion of major traffic movements on a few streets.

3. The plan should conform to and provide for the land development plan for the area.

4. Certain considerations must be given to urban development beyond the current planning period. Particularly in outlying or sparsely developed areas that have development potential, it is necessary to designate thoroughfares on a long-range planning basis to protect rights-of-way for future thoroughfare development.

5. While being consistent with the above principles and realistic in terms of travel trends, the plan must be economically feasible and environmentally sensitive.

IDEALIZED THOROUGHFARE PLAN



LEGEND

	EXISTING	PROPOSED
AJOR THOROUGHFARE FREEWAY		
MAJOR OTHER		
INOR THOROUGHFARE		
OCAL ROAD		
NTERCHANGE		
RADE SEPERATION		

LAND USES

- COMMERCIAL/BUSINESS
- RESIDENTIAL
- INDUSTRIAL
- PUBLIC/INSTITUTIONAL

Figure A–1

APPENDIX B

Thoroughfare Plan Street Tabulation and Recommendations

This appendix includes a detailed tabulation of all streets identified as elements of the Valdese-Rutherford College-Connelly Springs Thoroughfare Plan. The table includes a description of each section, as well as the length, cross-section, and right-of-way for each section. Also included are existing and projected average daily traffic volumes, roadway practical capacity (**Practical Capacity is at Level of Service (LOS) D**), and the recommended ultimate lane configuration. Due to space constraints, these recommended cross-sections are given in the form of an alphabetic code. A description and an illustrative figure of each letter code can be found in Appendix C.

The following index of terms may be helpful in interpreting the table:

NPB – Northern Planning Boundary

EPB – Eastern Planning Boundary

WPB – Western Planning Boundary

SPB – Southern Planning Boundary

ADQ – Adequate

N/A – Not Available

SW Loop - Refers to project previously known as SR 1726 Extension

It should be noted that the practical capacity listed for 2025 assumes full thoroughfare plan implementation.

APPENDIX B

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		EXISTING CONDITIONS				ADT	ADT	RECOMMENDATIONS	
FACILITY & SECTION	DIST	RDWY	ROW	NO. OF	CAPACITY	1998	2025	CROSS	CAPACITY
	(mi)	(ft)	(ft)	LANES	LOS D (vpd)	(vpd)	(vpd)	SECT.	LOS D (vpd)
I-40									
WPB – EPB	5.34	48	260	4	54,000	33,300	70,000	L	93,000
(Improve interchanges 111, 112, and 113)									
US 70									
WPB-SW Loop	0.10	22	60	2	12,000	13,000	27,000		
WPB - Hoyle Street	1.01	22	60	2	12,000	13,000	18,000		
Hoyle Street-Church Street	0.38	48	60	3	12,500	13,000	17,500		
Church Street-Eldred St.	0.83	35	60	3	9,700	11,000	10,000	J	12,000
Eldred Street-Refour	1.25	22	60	2	12,000	6,500	4,000	ADQ	ADQ
Refour-Malcolm Blvd	0.60	22	60	2	12,000	N/A	7000	ADQ	ADQ
Malcolm Blvd-Hilltop	0.60	22	60	2	12,000	9300	12,000	ADQ	ADQ
Hilltop – EPB	1.00	24	60	2	12,000	8,300	15,000	G	18,500
Brevard Street (SR 1554)									
Gardiol – Malcolm	0.73	18	60	2	9,000	1,300	1,500	ADQ	ADQ
(Realignment of intersection with Hilltop Street)									
Carolina Street (SR 1734/SR 1826)									
I-40 - Praley St.	0.58	44	50	2	12,500	3,700	8,400	ADQ	ADQ
Praley St-US 70	0.75	44	50	2	12,500	2,500	1,800	ADQ	ADQ
Church Street (SR 1538)									
US 70 – Tron	0.37	26	60	2	12,500	3,400	7,000	ADQ	ADQ
Tron – Meytre	0.90	20	`60	2	9,500	700	1,600	ADQ	ADQ
Meytre – Enon	0.59	18	60	2	9,500	N/A	1,000	ADQ	ADQ
Cline									
Hoyle - Praley	0.38	38	60	2	12,000	200	400	ADQ	ADQ
Eldred Street									
I-40 - US 70	1.02	24	60	2	12,000	4,700	10,000	H	13,800
US 70 – Laurel	0.19	16	40	2	8,000	900	3,500	K	ADQ
Enon Road									
US 70 - Meytre Extension	1.00	18	60	2	10,500	2,100	4,400	ADQ	ADQ
Meytre Extension-Church	0.60	18	60	2	10,500	1,600	2,800	ADQ	ADQ
(Improve intersection at Enon/US 70)									
Flat Gap Road (SR 1737)									
I-40 – Jacumin	0.65	18	60	2	12,000	1,300	2,300	ADQ	ADQ

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FACILITY & SECTION	DIST	RDWY	ROW	NO. OF	CAPACITY	1998	2025	CROSS	CAPACITY
	(mi)	(ft)	(ft)	LANES	LOS D (vpd)	(vpd)	(vpd)	SECT.	LOS D (vpd)
Gardiol St./Refour Road (SR 1547)									
Laurel - US 70	1.68	18	60	2	9,500	400	800	ADQ	ADQ
Hilltop Street (SR 1605)									
Malcolm Blvd-US 70	0.51	18	60	2	9,000	1,800	1,600	ADQ	ADQ
(Realignment of intersection with Hilltop Street)									
Hoyle Street (SR 1730)									
US 70/Main – Pineburr Ave	0.50	18	60	2	8,000	2,600	2,200	ADQ	ADQ
Israel Chapel Rd (SR 1607)									
US 70 – Tomlinson Loop	1.16	24	N/A	2	12,000	1,100	1,500	ADQ	ADQ
Jacumin Road (SR 1843)									
Flat Gap-WPB	1.43	18	60	2	9,000	600	1,200	ADQ	ADQ
Laurel Street (SR 1545)									
Lovelady-Eldred	1.25	20	60	2	9,500	1,900	7,500	ADQ	ADQ
(Laurel Street at US 70 to be relocated)									
Lovelady Road (SR 1546)									
Laurel - Malcolm Blvd	1.86	18	60	2	10,000	3,000	5,600	K	12,000
Malcolm Blvd-Tomlinson	1.15	--	--	--	--	--	3,300	K	12,000
Malcolm Blvd (SR 1001)									
Caldwell Co. - Lovelady	1.44	24	60	2	11,000	6,800	14,900	C	18,500
Lovelady – Hilltop	1.06	36	60	3	13,000	10,200	9,300	C	18,500
Hilltop - US 70	0.38	24	60	2	10,500	9,200	9,000	C	18,500
US 70 - I-40	0.57	20	60	2	8,000	10,300	15,000	C	18,500
(See Rutherford College Road)									
Meytre Avenue (SR 1576)									
SR 1535-Meytre Ave.	0.75	--	--	--	--	--		K	12,000
SR 1538 - .20 miles	0.27	18	60	2	10,500	2,000	4,800	K	ADQ
New location-Lovelady	.23	--	--	--	--	--	4,800	K	12,000
Milton Avenue (SR 1722)									
Pineburr – WPB	1.92	18	60	2	8,500	700	1,100	ADQ	ADQ
Mineral Springs Mtn Rd.(SR 1744)									
I-40-Rutherford College Rd	0.50	18	60	2	8,000	2,200	3,200	ADQ	ADQ

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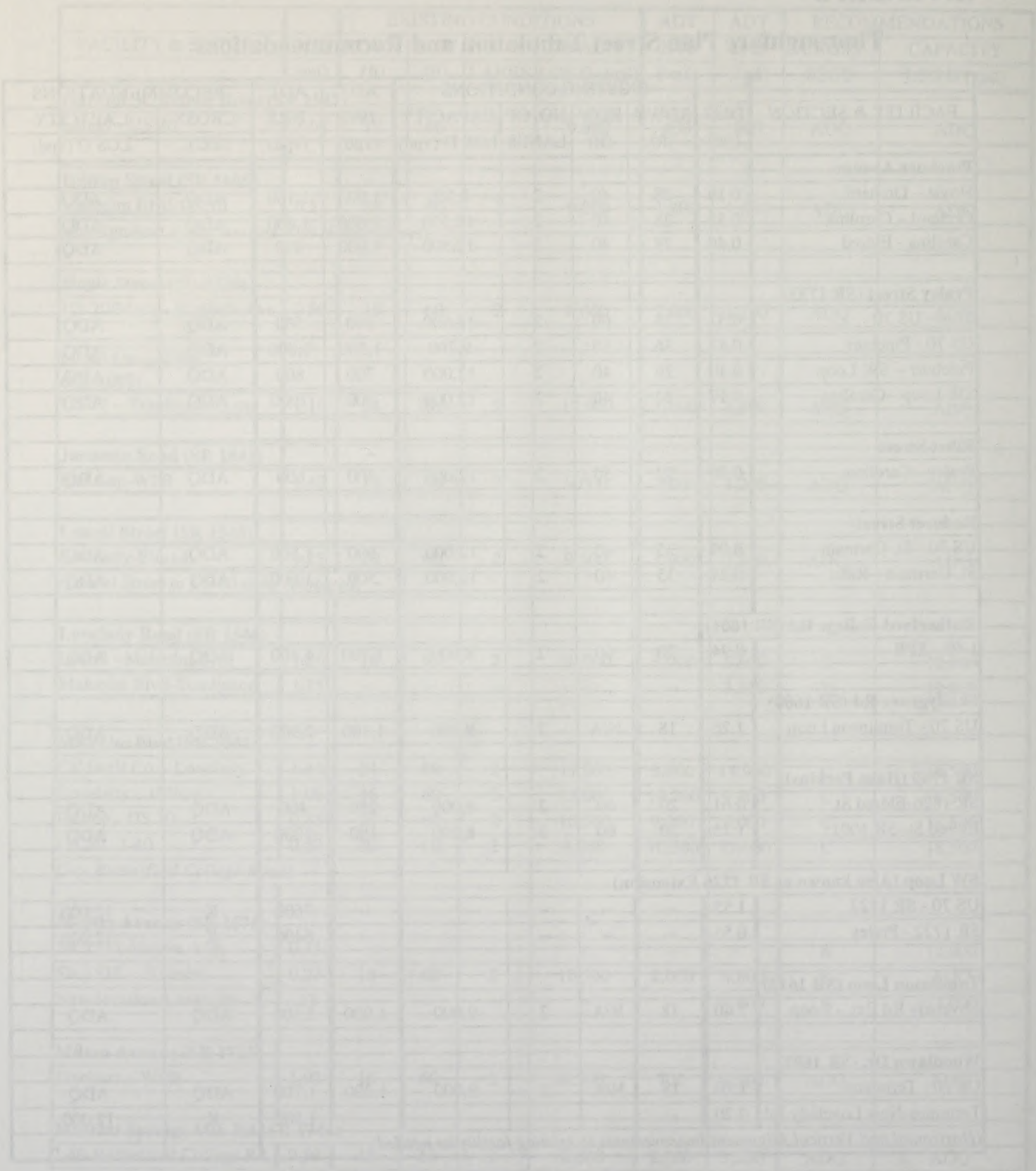
		EXISTING CONDITIONS				ADT	ADT	RECOMMENDATIONS	
FACILITY & SECTION	DIST	RDWY	ROW	NO. OF	CAPACITY	1998	2025	CROSS	CAPACITY
	(mi)	(ft)	(ft)	LANES	LOS D (vpd)	(vpd)	(vpd)	SECT.	LOS D (vpd)
Pineburr Avenue									
Hoyle – Orchard	0.19	28	40	2	8,500	1,000	1,100	ADQ	ADQ
Orchard – Carolina	0.53	28	40	2	12,500	1,000	1,600	ADQ	ADQ
Carolina - Eldred	0.40	28	40	2	12,500	1,000	400	ADQ	ADQ
Praley Street (SR 1733)									
Tron - US 70	0.37	24	60	2	12,500	100	500	ADQ	ADQ
US 70 - Pineburr	0.43	36	60	2	9,700	1,500	3,000	ADQ	ADQ
Pineburr – SW Loop	0.40	20	40	2	12,000	700	800	ADQ	ADQ
SW Loop - Carolina	0.17	20	40	2	12,000	700	7000	ADQ	ADQ
Ribet Street									
Praley - Carolina	0.36	22	50	2	12,000	300	600	ADQ	ADQ
Rodoret Street									
US 70 - St. Germain	0.09	35	40	2	12,000	500	1,500	ADQ	ADQ
St. Germain - Ribet	0.21	35	40	2	12,000	500	1,600	ADQ	ADQ
Rutherford College Rd (SR 1001)									
I-40 – SPB	0.94	20	60	2	8,000	1,700	4,400	ADQ	ADQ
Shadygrove Rd (SR 1608)									
US 70 - Tomlinson Loop	1.26	18	N/A	2	9,000	1,100	2,900	ADQ	ADQ
SR 1740 (Haus Perkins)									
SR 1826-Eldred St.	0.61	20	60	2	8,000	250	400	ADQ	ADQ
Eldred St.-SR 1001	1.25	20	60	2	8,000	480	1000	ADQ	ADQ
SW Loop (Also known as SR 1726 Extension)									
US 70 - SR 1722	1.55	--	--	--	--	--	7600	K	12,000
SR 1722 - Praley	0.55	--	--	--	--	--	6400	K	12,000
Tomlinson Loop (SR 1613)									
Lovelady Rd Ext. - Loop	2.40	18	N/A	2	9,000	1,000	2,300	ADQ	ADQ
Woodlawn Dr. (SR 1602)									
US 70 - Terminus	1.10	18	N/A	2	9,000	1,200	1,700	ADQ	ADQ
Terminus-New Lovelady Rd	0.20	--	--	--	--	--	1,500	K	12,000
(Horizontal and Vertical Alignment Improvements to existing facility as needed)									



APPENDIX C

Typical Cross Sections

Cross section requirements for thoroughfares vary according to the desired capacity and level of service to be provided. Universal standards in the design of thoroughfares are not practical. Each street section must be individually analyzed and its cross section requirements determined on the basis of amount and type of projected traffic, existing capacities, desired level of service, and available right-of-way.

Typical cross section recommendations are shown in Figure C-1. These cross sections are typical for facilities on new location and where right -of-way constraints are not critical. For widening projects and urban projects with limited right-of-way, special cross sections should be developed that meet the needs of the project.

Recommended typical cross sections for thoroughfares were derived on the basis of projected traffic, existing capacities, desirable levels of service, and available right-of-way. The recommended typical cross sections for the thoroughfares are given in Appendix B, Table B-1 along with other pertinent information.

On all existing and proposed major thoroughfares delineated on the thoroughfare plan, adequate right-of-way should be protected or acquired for the ultimate cross sections. Ultimate desirable cross sections for each of the thoroughfares are listed as part of the Street Inventory in Appendix B. Recommendations for "ultimate" cross sections are provided for the following:

- thoroughfares which may require widening after the current planning period,
- thoroughfares which are borderline adequate and accelerated traffic growth could render them deficient, and
- thoroughfares where an urban curb and gutter cross section may be locally desirable because of urban development or redevelopment.

A - Four Lanes Divided with Median - Freeway

Cross-section "A" is typical for four lane divided highways in rural areas that may have only partial or no control of access. The minimum median width for this cross section is 46 feet, but a wider median is desirable.

B - Seven Lanes - Curb & Gutter

Cross section "B" is typically not recommended for new projects. When the conditions warrant six lanes, cross section "D" should be recommended. Cross section "B" should be used only in special situations such as when widening from a five-lane section and right-of-way is limited. Even in these situations, consideration should be given to converting the center turn lane to a median so that cross section "D" is the final cross section.

C - Five Lanes - Curb & Gutter

Typical for major thoroughfares, cross section "C" is desirable where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

D - Six Lanes Divided with Raised Median - Curb & Gutter/ E - Four Lanes Divided with Raised Median - Curb and Gutter

Cross sections "D" and "E" are typically used on major thoroughfares where left turns and intersection streets are not as frequent. Left turns would be restricted to a few selected intersections. The 16 ft median is the minimum recommended for an urban boulevard type cross section. In most instances, monolithic construction should be utilized due to greater cost effectiveness, ease and speed of placement, and reduced future maintenance requirements. In special cases, grassed or landscaped medians result in greatly increased maintenance costs and an increase in danger to maintenance personnel. Non-monolithic medians should only be recommended when the above concerns are addressed.

F - Four Lanes Divided - Boulevard, Grass Median

Cross-section "F" is typically recommended for urban boulevards or parkways to enhance the urban environment and to improve the compatibility of major thoroughfares with residential areas. A minimum median width of 24 ft is recommended with 30 ft being desirable.

G - Four Lanes - Curb & Gutter

Cross section "G" is recommended for major thoroughfares where projected travel indicates a need for four travel lanes but traffic is not excessively high, left turning movements are light, and right-of-way is restricted. An additional left turn lane would probably be required at major intersections. This cross section should be used only if the above criterion is met. If right-of-way is not restricted, future strip development could take place and the inner lanes could become de facto left turn lanes.

H - Three Lanes - Curb & Gutter

In urban environments, thoroughfares which are proposed to function as one-way traffic carriers would typically require cross section "H".

I - Two Lanes - C&G, Parking both sides: J - Two Lanes - C&G, Parking one side

Cross sections "I" and "J" are usually recommended for urban minor thoroughfares since these facilities usually serve both land service and traffic service functions. Cross section "I" would be used on those minor thoroughfares where parking on both sides is needed as a result of more intense development.

K - Two Lanes - Paved Shoulder

Cross section "K" is used in rural areas or for staged construction of a wider multi-lane cross section. On some thoroughfares, projected traffic volumes may indicate that two travel lanes will adequately serve travel for a considerable period of time. For areas that are growing and future widening will be necessary, the full right-of-way of 100 ft should be required. In some instances, local ordinances may not allow the full 100 ft. In those

cases, 70 ft should be preserved with the understanding that the full 70 ft will be preserved by use of building setbacks and future street line ordinances.

L - Six Lanes Divided with Grass Median - Freeway

Cross section "L" is typical for controlled access freeways. The 46 ft grassed median is the minimum desirable median width, but there could be some variation from this depending upon design considerations. Right-of-way requirements would typically vary upward from 228 ft depending upon cut and fill requirements.

M - Eight Lanes Divided with Raised Median - Curb & Gutter

Also used for controlled access freeways, cross section "M" may be recommended for freeways going through major urban areas or for routes projected to carry very high volumes of traffic.

N - Five Lanes/C&G, Widened Curb Lanes; O - Two Lane/Shoulder Section; P - Four Lanes Divided/Raised Median, C&G, Widened Curb Lanes

If there is sufficient bicycle travel along the thoroughfare to justify a bicycle lane or bikeway, additional right-of-way may be required to contain the bicycle facilities. The North Carolina Bicycle Facilities Planning and Design Guidelines should be consulted for design standards for bicycle facilities. Cross sections "N", "O", and "P" are typically used to accommodate bicycle travel.

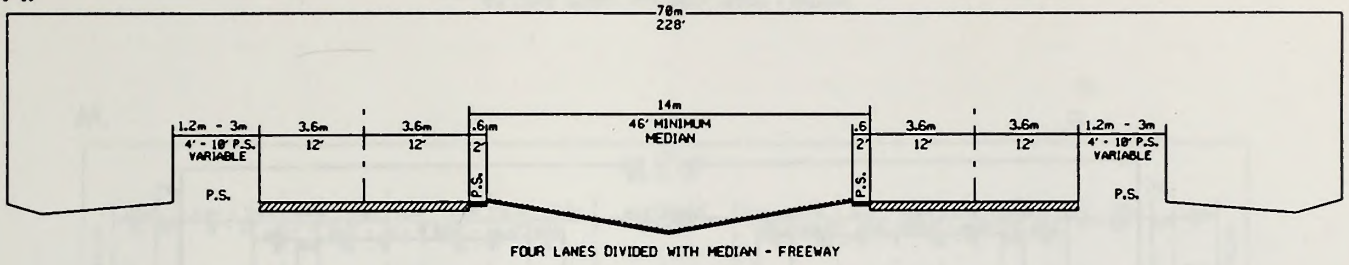
General

The urban curb and gutter cross sections all illustrate the sidewalk adjacent to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. If it is desired to move the sidewalk farther away from the street to provide additional separation for pedestrians or for aesthetic reasons, additional right-of-way must be provided to insure adequate setback for utility poles.

The right-of-ways shown for the typical cross sections are the minimum right-of-way required to contain the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may require either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban thoroughfare construction.

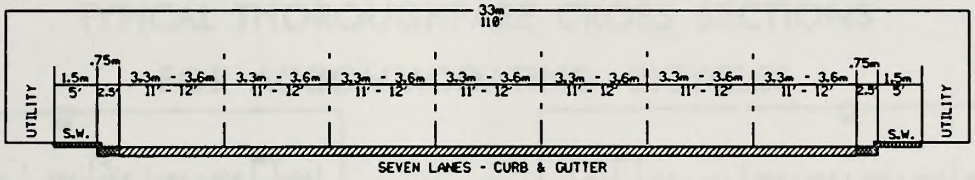
TYPICAL THOROUGHFARE CROSS SECTIONS

A.



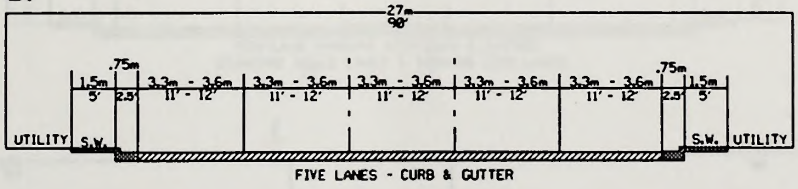
FOUR LANES DIVIDED WITH MEDIAN - FREEWAY

B.



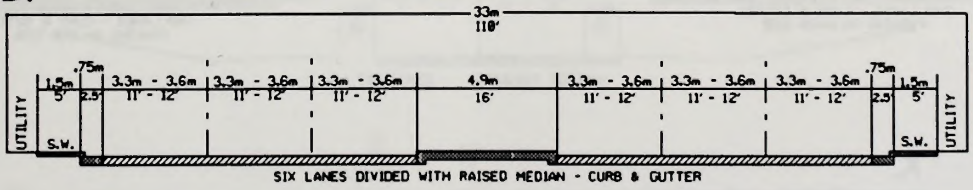
SEVEN LANES - CURB & GUTTER

C.



FIVE LANES - CURB & GUTTER

D.

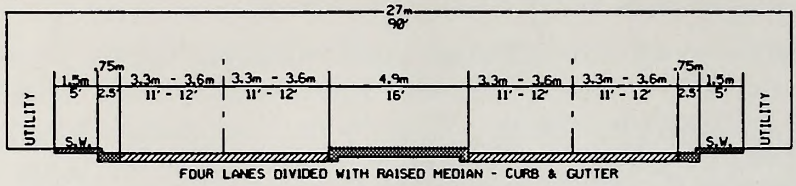


SIX LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

FIGURE C–1

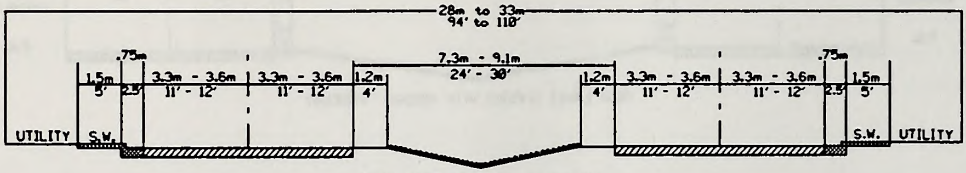
TYPICAL THOROUGHFARE CROSS SECTIONS

E.



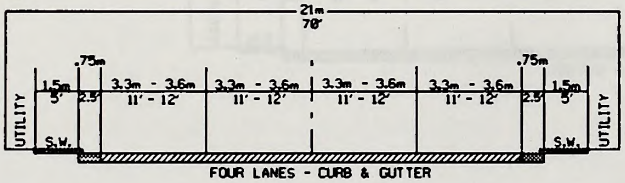
FOUR LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

F.



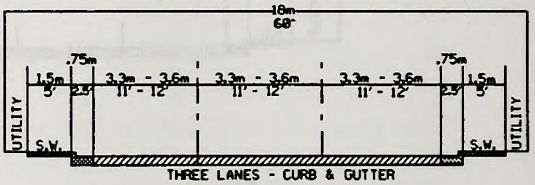
FOUR LANES DIVIDED - BOULEVARD
GRASS MEDIAN

G.



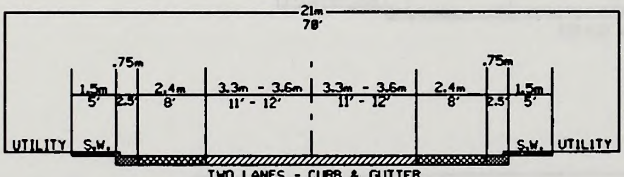
FOUR LANES - CURB & GUTTER

H.



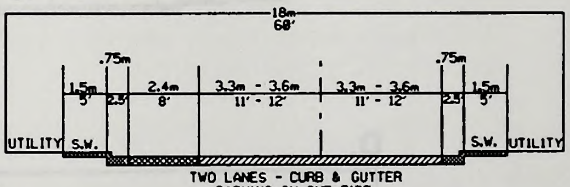
THREE LANES - CURB & GUTTER

I.



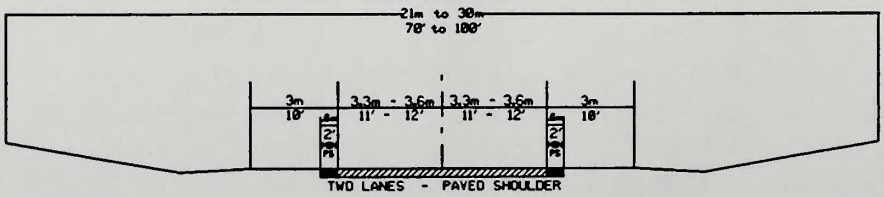
TWO LANES - CURB & GUTTER
PARKING ON EACH SIDE

J.



TWO LANES - CURB & GUTTER
PARKING ON ONE SIDE

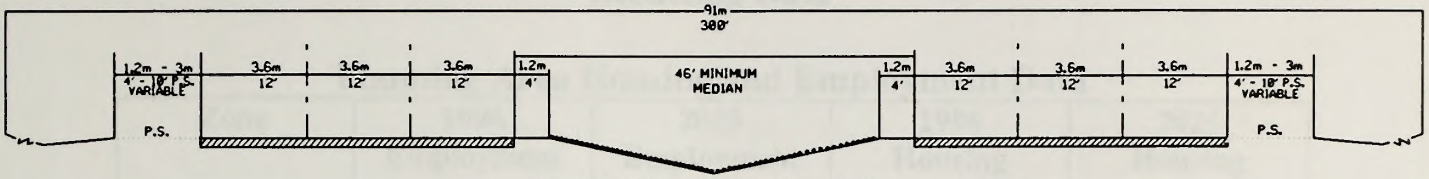
K.



TWO LANES - PAVED SHOULDER

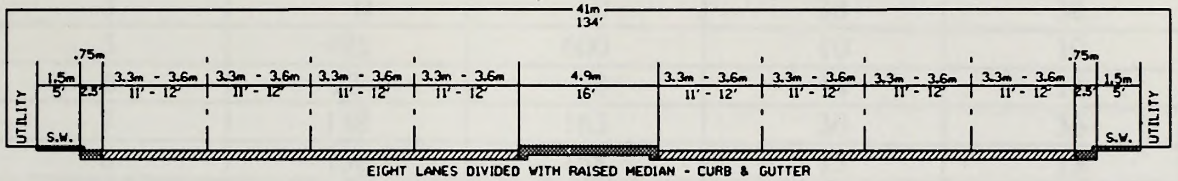
TYPICAL THOROUGHFARE CROSS SECTIONS

L.



SIX LANES DIVIDED WITH GRASS MEDIAN - FREEWAY

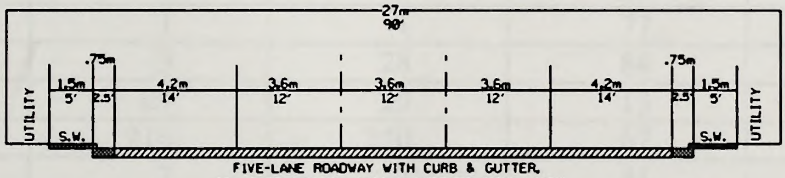
M.



EIGHT LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

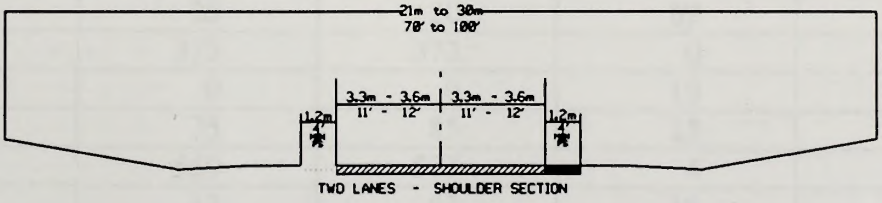
TYPICAL THOROUGHFARE CROSS SECTIONS FOR ACCOMMODATING BICYCLES

N.



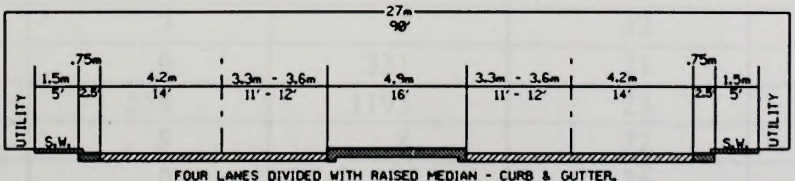
FIVE-LANE ROADWAY WITH CURB & GUTTER.
STANDARD INSIDE LANES & WIDENED CURB LANES

O.

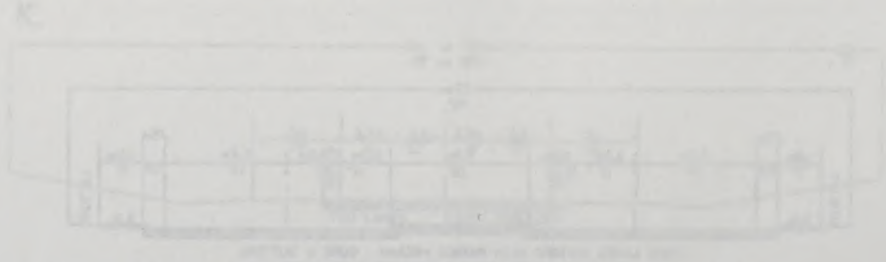


TWO LANES - SHOULDER SECTION

P.



FOUR LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER.
STANDARD INSIDE LANES & WIDENED CURB LANES



APPENDIX D

Modeling Data

Planning Area Housing and Employment Data

Zone	1996 Employment	2025 Employment	1996 Housing	2025 Housing
1	257	262	39	39
2	147	150	21	21
3	0	0	12	12
4	0	0	38	38
5	495	600	10	10
6	23	23	14	14
7	138	163	36	36
8	158	158	13	13
9	0	0	63	63
10	187	317	43	43
11	735	742	0	0
12	0	0	0	0
13	1	1	168	168
14	121	136	11	11
15	1	3	53	133
16	1	1	77	232
17	3	28	84	84
18	29	29	13	13
19	216	220	67	67
20	7	7	41	41
21	4	4	60	60
22	0	0	155	165
23	3	3	72	72
24	20	20	62	62
25	373	373	0	0
26	0	0	19	19
27	75	85	25	65
28	569	577	4	4
29	43	63	18	18
30	2	2	77	77
31	83	83	160	225
32	5	7	68	98
33	7	7	83	83
34	6	331	21	56
35	558	1193	23	158
36	8	8	22	82
37	0	0	36	81

Zone	1996 Employment	2025 Employment	1996 Housing	2025 Housing
38	25	60	55	93
39	233	333	0	0
40	450	645	0	0
41	15	28	15	15
42	23	38	9	9
43	472	572	48	48
44	0	0	8	8
45	2	2	23	23
46	0	0	14	14
47	38	38	33	33
48	1	1	68	68
49	1	1	40	40
50	9	9	149	194
51	4	4	101	101
52	0	0	102	102
53	2	2	54	54
54	21	21	107	107
55	4	4	100	100
56	9	9	76	76
57	20	20	5	5
58	11	11	71	291
59	2	12	122	282
60	50	141	282	322
61	22	22	58	58
62	69	69	78	82
63	41	41	114	140
64	569	569	44	44
65	143	168	98	98
66	85	109	89	105
67	8	8	82	132
68	11	11	36	96
69	0	0	19	19
70	25	25	0	0
Totals	**6640**	**8534**	**3808**	**5084**

Modeling Files

1996 Files

- Valdese.net = 1996 unloaded network
- Idsin2.txt = 1996 IDS input file (P's and A's are output (Pas.val))
- Ttrip2.tab = 1996 thru trip table
- Tot96.val = 1996 total trip table
- 96load.val = loaded 1996 base network
- Network.txt = Network node coordinates

2025 Files

- Pcvaltp.net = 2025 unloaded thoroughfare plan network
- Idsin.txt = 2025 IDS input file (P's and A's are output (Pas.val))
- Ttrip.tbl = 2025 thru trip table
- Ptot25.val = 2025 total trip table
- PC25lod.val = 2025 loaded thoroughfare plan network

All-or-Nothing Loading was used when loading the network.

APPENDIX E

Pedestrian Policy Guidelines

These guidelines provide a procedure for implementing the Pedestrian Policy adopted by the Board of Transportation in August 1993. The Pedestrian Policy addresses TIP projects and makes an important distinction between "considering the needs of pedestrians to avoid creating hazards to pedestrian movements" and the concept of "facilitating pedestrian movements for other reasons."

Hazards

A hazard in this context is defined as a situation when pedestrian movements are physically blocked in a manner which forces pedestrians to use another mode of transportation or walk in an automobile traffic lane (parallel with the automobile traffic) to pass a barrier. The concept of "not creating a hazard" is intended to allow municipalities to have the flexibility to add pedestrian facilities as part of the project, or in the future after the TIP project is complete. The current standard cross sections generally do not create barriers for pedestrian movements. One exception is on urban bridges where the bridge rail is at the back of the curb.

Quantifying the need for Pedestrian Facilities

Planning studies should evaluate the need for pedestrian facilities based on the degree to which the following criteria are met.

1. Local Pedestrian Policy
2. Local Government Commitment
3. Continuity and Integration
4. Locations
5. Generators
6. Safety
7. Existing or Projected Pedestrian Traffic

Requirements for DOT Funding

Replacing Existing Sidewalks

The DOT will pay 100% of the cost to replace an existing sidewalk that is removed to make room for a widening project.

Preventing Hazards

If there is evidence that a TIP project would create a hazard to existing pedestrian movements, the DOT will take the initiative not to create the hazard. However, if there is not evidence that a TIP project would create a hazard to existing pedestrian movements, the municipality will need to prove that there will be pedestrian movements, which would be affected within five years by the hazard created by the TIP project.

Incidental Projects

Due to the technical difficulty of describing justification for pedestrian facilities, the committee chose a cost sharing approach to provide cost containment for the pedestrian facilities. The DOT may share the incremental cost of constructing the pedestrian facilities if the "intent of the criteria" is met. The DOT will pay a matching share of incidental pedestrian facility total construction costs up to a cap of no more than 2% of total project construction cost. The matching share is a sliding scale based on population as follows.

Table E-1

Incidental Projects Cost Participation Break Down

Municipal Population	Participation	
	DOT	Local
> 100,000	50%	50%
50,000 to 100,000	60%	40%
10,000 to 50,000	70%	30%
< 10,000	80%	20%

Funding Caps

Under normal circumstances, the cumulative funding for preventing hazards and providing incidental pedestrian facilities should not exceed 2% of the total project construction cost.

Independent Projects

The DOT will have a separate category of money for all independent pedestrian facility projects in North Carolina. The independent pedestrian facility funds will be administered similar to the Bicycle Program.

Right-of-Way

In general, municipalities are responsible for providing any right-of-way needed to construct pedestrian facilities. However, the 8-foot berm the DOT generally provides on urban curb and gutter facilities can accommodate pedestrian facilities.

Maintenance

Local governments will be responsible for maintaining all pedestrian facilities.

For further information about the Pedestrian Policy Guidelines please contact the following:

Statewide Planning Branch
NC Department of Transportation
1554 Mail Service Center
Raleigh, NC 27699
(919)733-4705

APPENDIX F

Transportation Improvement Program (TIP) Project Process

The process for attempting to get a project into the TIP is described briefly in this appendix.

The local representatives should first decide which projects from the thoroughfare plan they would like funded and placed in the TIP. A TIP request for a few carefully selected projects is likely to be more effective than requesting all the projects proposed in the thoroughfare plan. These projects should be prioritized by the local representatives and summarized briefly, as shown on Appendix F, page 3.

After determining which projects the highest priority for the area, a TIP project request should be sent to the Board of Transportation Member from the municipality's or county's respective district. The TIP project request should include a letter with a prioritized summary of requested projects, as well as a TIP candidate project form and a project location map for each project. An example of each of these items is included in this appendix.

Example

* *Note: This is not an official request submitted to the Board of Transportation. This is intended to be an example of a Transportation Improvement Program (TIP) Request.*

Month ##, Year

North Carolina Board Member
N. C. Board of Transportation
N. C. Department of Transportation
P. O. Box 25201
Raleigh, NC 27611-5201

Dear Board Member:

SUBJECT: 2000-2006 TIP Project Requests for *Generic City*

Enclosed find the projects requested by *Generic City* for consideration in the next TIP update. The list is presented by priority, as approved by the *Generic City* Council at their *Month* meeting.

Generic City also endorsed the existing schedule of projects contained in the current TIP for the city, with one request. The City requests that TIP Project R-*XXXX* remain as a high priority and kept on the existing schedule.

We thank you for the opportunity to participate in development of the State TIP. Please contact us immediately if additional information is needed concerning any of the enclosed project requests.

Sincerely,

John Q. Public

cc: Division Engineer
Enclosure

Generic City
City Council
2000 Proposed Highway Projects (Final)

1) **SR 1111 (Town Street) & SR 1112 (Industry Drive) TIP Project R-XXXX**
   - From SR 1113 (Country Road) to NC 11
   - Widen roadway to a multilane facility, with some new location

2) **US 11**
   - From SR 1112 (Industry Drive) to SR 1113 (Country Road)
   - Widen roadway to a multilane facility

3) **NC 11**
   - From SR 1114 (Any Road) to the existing four lane section just south of I-85
   - Widen roadway to a multilane facility

4) **US 11 Business (Business Road)**
   - From SR 1115 (Some Road) to NC 12
   - Widen facility to a five lane cross section

5) **New Connector**
   - From US 11 to US 112 Business (City Street)
   - New Facility

Highway Program
TIP Candidate Project Request

(Please Provide Information if Available)

Date ##/##/##
Priority No. #

County *Generic* *Generic*

City/Town

Requesting Agency *Generic City Council*

NCTIP No. *R-####* (if available)

Route (US, NC, SR/Local Name) *SR 1111(Town Street) and SR 1112(Industry Drive)*

Project Location (From/To/Length) *From SR 1113 (Country Road) to NC 11, #.# miles*

Type of Project (Widening, New Facility, Bridge Replacement, Signing, Safety, Rail Crossing, Bicycle, Enhancement, etc.)
Widen roadway to a multi-lane facility, with some new location.

Existing Cross Section *24* Feet,

Type

Existing Row *60 to 80* Feet *(1997)*

Existing ADT *8,000*

Estimated Cost, ROW $ *900,000*

Construction $ *4,000,000*

Brief Justification for Project *As a major thoroughfare, this facility carries increasing traffic volumes between the industial sites along this route to NC 11 and the I-85 corridor. In the adopted thoroughfare plan for Generic City, it is recommended that this facility should be widened to a multi-lane cross section due to the increasing volume and the potential for more development in this area. The City requests that this project continue to be funded.*

Project Supported By (Agency/Group)

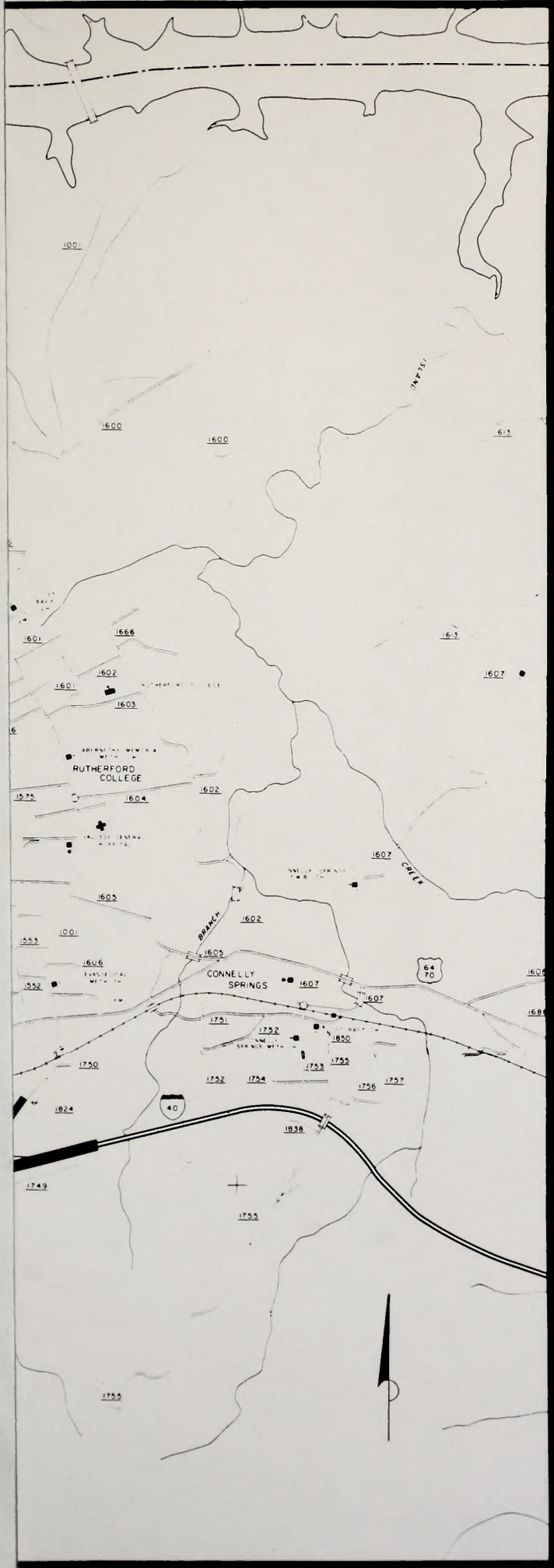
Other Information/ Justification

☒ Part of Thoroughfare Plan
☐ Part of Comprehensive Plan
☐ Serves School
☐ Serves Hospital
☐ Obsolete Facility
☐ Serves Park
☐ High Accident (# _____)
☐ _____

(Please Attach Map Showing Project Location)

APPENDIX G

1978 Valdese Thoroughfare Plan



THOROUGHFARE PLAN

PUBLIC HEARING IN VALDESE ON APRIL 3,1978

ADOPTED BY VALDESE ON MAY 1,1978

RECOMMENDED APPROVAL BY PLANNING AND RESEARCH BRANCH ON MAY 2,1978

ADOPTED BY NORTH CAROLINA BOARD OF TRANSPORTATION ON MAY 19,1978

THOROUGHFARES

	EXISTING	PROPOSED ALIGNMENTS
FREEWAY	▬▬	▮▮▮
OTHER MAJOR	▬	▮▮▮
MINOR	—	▮▮▮
LONG RANGE		▮▮▮▮▮▮▮▮▮
INTERCHANGE	●	⬢
GRADE SEPARATION ONLY	○	⬡

THOROUGHFARE PLAN

VALDESE

NORTH CAROLINA

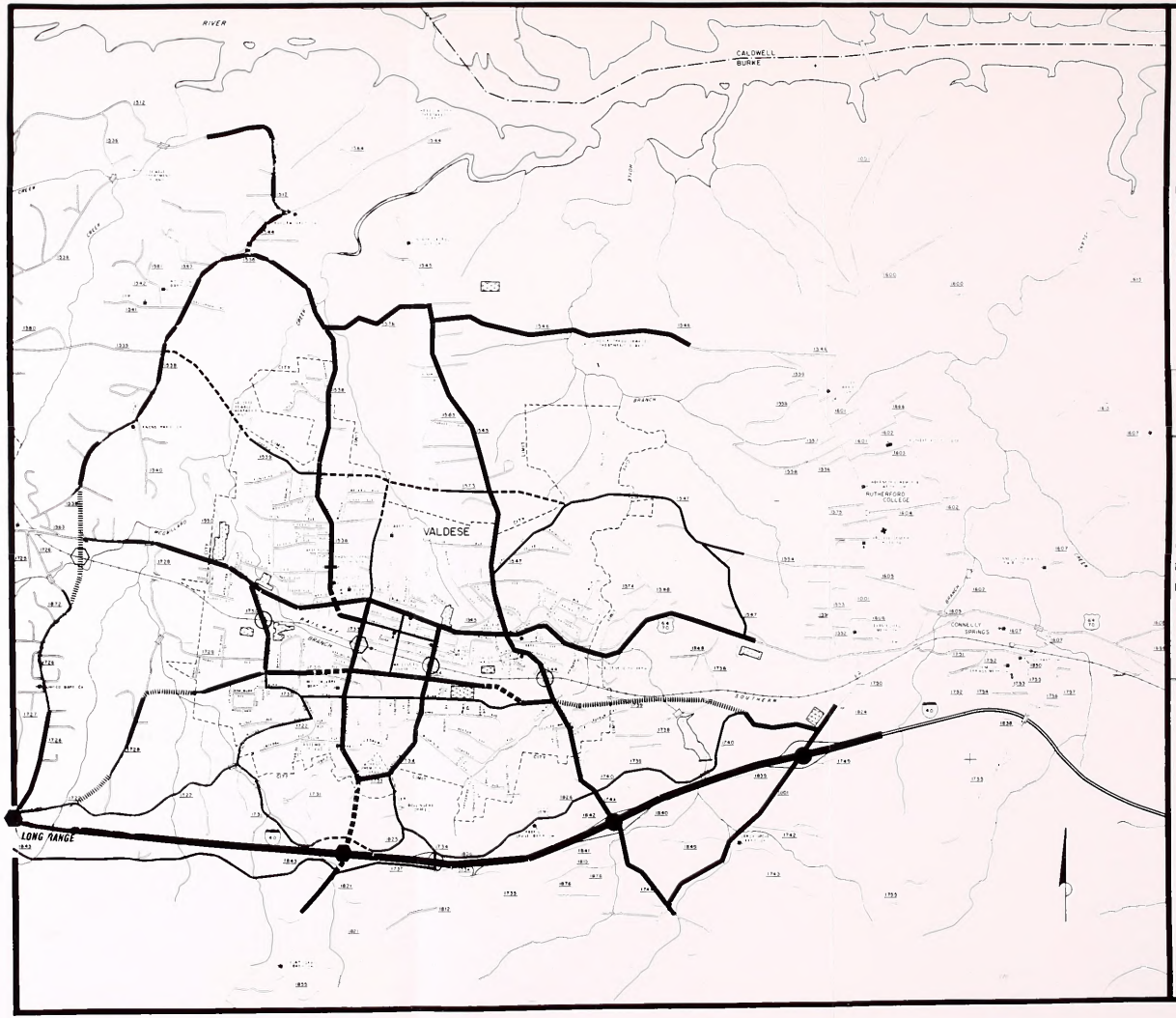
APRIL 3 ,1978

Figure G1

0 5 1 Kilometer

0' 1000' 2000'

1974



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THOROUGHFARES

	EXISTING	PROPOSED ALIGNMENTS
FREEWAY	▬	▬
OTHER MAJOR	▬	▬
MINOR	—	- -
LONG RANGE		·····
INTERCHANGE	●	⬢
GRADE SEPARATION ONLY	○	⬡

THOROUGHFARE PLAN

VALDESE

NORTH CAROLINA

APRIL 3,1978

Figure G1

Kilometers

1974